DOCUMENT RESUME

ED 240 771 EC 161 834

AUTHOR	Kahn, Ruth Jacobson
TITLE	Parents as Teachers: Linguistic and Behavioral Interactions of Middle-Class Mothers and Fathers and their Normally Developing and Developmentally Delayed Preschoolers during Teaching/Learning Activities. Final Report.
INSTITUTION	Connecticut Univ., Storrs.
SPONS AGENCY	Special Education Programs (ED/OSERS), Washington, DC.
PUB DATE	81
GRANT	G007800006
NOTE	633p.; Ph.D. Dissertation, University of Connecticut. The study was also funded by the University of Connecticut Research Foundation. Document may not reproduce well.
PUB TYPE	Dissertations/Theses - Doctoral Dissertations (041) -- Reports - Research/Technical (143)
EDRS PRICE	MF03/PC26 Plus Postage.
DESCRIPTORS	*Disabilities; *Interaction; *Linguistics; *Parent Child Relationship; *Parent Role; Preschool Education; *Teaching Methods

ABSTRACT

Twenty-three parent/child dyads (16 normally developing and 7 developmentally delayed preschoolers) were observed in a study to describe the verbal-logical behaviors and content expressed while they were engaged in teaching/learning interactions, and to determine if the structure of the activity, the sex and/or the developmental status of the children, or the sex/role of the parents influenced those behaviors. Dyads engaged in a semi-structured free play activity followed by a structural block sorting task. An observation system was used which permitted coding of verbal behaviors in terms of linguistic forms, communicative functions, and content references. Results of analyses of variance revealed that the activity factor had the greatest impact on the expressed behavior. The activity influenced both parent behavior (including frequencies of initiating, asking questions, and giving orders) and child behavior (such as soliciting, requesting or providing substantive information, and cooperating). The only behaviors differentiating groups of parents and their children were their verbalizing and references to spatial relationships and classification. The activity also exerted the most influence on sequences of behaviors. Few parent sex/role differences were observed. (CL)

PARENTS AS TEACHERS:

LINGUISTIC AND BEHAVIORAL INTERACTIONS OF MIDDLE-CLASS MOTHERS AND FATHERS AND THEIR NORMALLY DEVELOPING AND DEVELOPMENTALLY DELAYED PRESCHOOLERS DURING TEACHING/LEARNING ACTIVITIES

Final Report.

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A.B., Queens College, 1959
A.M., Teachers College, Columbia University, 1965

A Dissertation

Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Philosophy

at

The University of Connecticut

1981

APPROVAL PAGE

Doctor of Philosophy Dissertation

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The University of Connecticut

1981

ACKNOWLEDGEMENTS

This study took a great deal of time and effort. It could not have been completed without the support and assistance of numerous people.

First of all, I want to thank my daughters Kim Lee and Tamara Regina for all the many times they had to pinch hit for me as mother and housekeeper. Even more important, however, was the faith they had in me and my ability to complete the task I'd set for myself. Knowing that I wanted to complete this project, they encouraged and supported me without ever questioning whether it was worth the time or effort I was expending.

I want to thank my husband Michael for financing, much of this massive enterprise, for tolerating it, for his editorial assistance, and most particularly for the gift of his love and friendship which always sustains me.

I want to thank my son Benjamin for all the times he let me work on my dissertation in peace, and I want to apologize for all the times I could not look at his baseball cards, his stamp collection, or his fish.

I want to thank my parents for their love, their encouragement, and their faith in me. They have always made me feel that they believed there was nothing I really wanted to do that I shouldn't or couldn't do, and that they would always be available to help me in anyway they could. I thank my father for teaching me to have patience, tolerance, and perseverance, and my mother for teaching me to have the courage of my convictions.

This study could never have been undertaken or completed without the support and assistance of my committee. I thank my major advisor and friend Dr. A. J. Pappanikou for his faith in me, for his efforts to obtain financial support for this study, and for his capacity to allow me the time and the freedom to pursue my interests, to learn, and to grow with this experience. I thank Dr. Harris Kahn for his dry sense of humor in the face of the confusion I often presented and for the statistical counsel he offered that made it possible for me to deal with and, hopefully, to resonably interpret all the data I had collected. I thank Dean Robert G. Ryder for his help in programming the data entry system and in designing and conceptualizing the inter-rater reliability study, for taking the time to teach me how to pursue this type of interaction research, and for sharing his research and statistical expertise with me.

A very special thanks is due to Jack Davis, whose

official title as coordinator for technical support does not do justice to his genius as a computer programmer, his mastery of statistics, or his ability as an astute critic of research. It was his assistance that made it possible to operationalize the storing of the data and the extracting of the results. Talking with him forced me to clarify my thinking and to specify the questions I was interested in asking.

Maud Sabourin, out of the goodness of her heart, agreed to script-type this massive work. I am extremely grateful to her for the many late hours she devoted, the special care with which she completed this work, and for sticking by me and finishing this task, even though at the end the pressure to meet the deadline was enormous. Without Maud's assistance I could not have completed this dissertation in time to graduate this year.

Dr. Albert Dreyer and Chris Dreyer both read earlier drafts of this report and their substantive and editorial suggestions were enormously helpful to me. I am very lucky to have them both as dear friends and honest critics.

I owe a real debt of appreciation to the parents and children who participated in this study. I am grateful for their willingness to share their time, for their willingness to allow me to observe them, and for the experience of meeting them all. They were without exception delightful families to observe and talk to.

I could not have obtained the population for this study without the help of Mariel Hoffman, the director of Saint Alban's Children's Center, Dr. Robert M. Greenstein, Department of Pediatrics, University of Connecticut Health Center, Dr. George R. Healey, former director, and Ms. Chris Clarke, teacher, of the Area Cooperative Special Education program. Dr. Gary. W. Nix, director of the Mystic Oral School, and Mr. Mark Hawk, assistant principal of the Lower School at the Mystic Oral School,

The original typescripts of the recorded observations were painstakingly completed by Diane Hubell and innumerable hours of thoughtful coding and discussions of the data were provided by Karen Sweeney, Jane Lyman, and Terry Bujnowski Sullivan.

The audio-visual department staff at the University of Hartford, the University of Connecticut College of Education, and the Mystic Oral School all deserve a special thank you. I am also grateful that the facilities of these three institutions were made available to me.

I really appreciate having been able to use the facilities of the Institute for Social Inquiry at the

University of Connecticut and the Computer Center. On various occasions the staff of the Institute for Social Inquiry have been usually helpful and kind to me, and I thank them all.

Funding for this study was gratefully accepted from the Bureau for the Education of the Handicapped of the Department of Health, Education, and Welfare, Office of Education (grant no. G007800006), from the University of Connecticut Research Foundation, and from my husband Michael Kahn.

TABLE OF CONTENTS

LIST OF TABLES

Chapter I

INTRODUCTION

The focus of this study is on describing and comparing parents as teachers of differentially developing children. This author's interest is in discovering the strategies and techniques used by parents and their preschool children when the goal is to facilitate the cognitive development of those children. In trying to clarify this aspect of parent/child interactions, this investigation concentrated on observing language behavior expressed when parents were teaching their own children. The specific verbal-logical behaviors which have been investigated for this study were: (1) the topics of conversations discussed by parents and their children during educationally oriented activities (i.e., the content), (2) the linguistic forms that they utilized during these conversations (e.g., soliciting, responding), and (3) the communicative functions that they expressed (e.g., defining, fact-stating, explaining). (Table 1 in the <u>definition of terms</u> section of this chapter includes a summary of the coding categories that were utilized for this study with some examples from the data that was collected.)

A great deal of research effort has been directed towards discovering the personal characteristics and skills that are essential for effective teachers. In spite of this effort, no coherent theory of teaching or definitive models for optimal teacher/learner interactions are available. (Adams & Biddle, 1970; Brophy & Evertson, 1976; Dunkin & Biddle, 1974; Gage, 1972; Hyman, 1974; Jackson, 1968). Observations of classroom interactions, which had been heralded as an innovative and more appropriate paradigm for gaining an understanding of the teaching process (Biddle, 1964; Smith, 1963), have not yet fulfilled their promise (Dunkin & Biddle, 1974; Rosenshine & Furst, 1971). Perhaps this is because observational research aimed at understanding the processes involved in teacher/learner interactions have all focused exclusively on observations of experienced, professionally trained teachers, or on teachers-in-training. However, parents are children's first teachers (Gray, 1971) and, for the most part, seem to do a fairly adequate job of teaching their children various skills, even though they lack any formal training.

Observations of the naturalistic behaviors of parents teaching their children, in a variety of situations, have the potential to uncover aspects of the teaching/learning experience which have been overlooked by educational researchers who assume that teaching can only be defined as a classroom phenomenon under the jurisdiction of a specially trained educator. Research concentrating on the interactions between teaching parents and their children should prove useful in developing guidelines for parents involved in programs that are attempting to enhance the cognitive and/or socio-emotional development of their normally developing and/or developmentally delayed children; it also should provide a new and different perspective for understanding teaching in general.

The personal motivation for pursuing this study comes from a long term professional commitment to the idea that parents can, do, and should participate in educating their own children. Working with developmentally delayed children and their parents over the years has convinced this investigator that when special educators and parents work together to support and supplement each others educational efforts, the children, the families, the schools, and ultimately the society, benefit. Within this personal context, the advent of recent legislation, litigation, and social changes which provide an impetus to the growing interest in preschool education have been welcomed. At the same time, however, it has become evident that programs, particularly those aimed at interventions with children who have special needs, were proliferating, regardless of merit. Frequently "model programs" have been developed without any theoretical foundations or comprehensive conceptual frameworks for assessing appropriate curricula or teaching strategies.

Evaluation research clearly has favored the "family centered" preschool intervention programs (Bronfenbrenner, 1974, Goodson & Hess, 1975). As a result, the present trend among advocates of programs for developmentally delayed or disadvantaged youngsters is to support early, long term interventions that focus on a parent-training component in order to insure that educational strategies leading to achievement gains are supported and maintained in the home environment (Gray, 1971; Honig, 1975; Karnes, 1972; Karnes & Teska, 1975, Lambie, Bond & Weikart, 1974; Levenstein, 1971; Schaefer, 1972; Siegal, Secrist & Forman, 1972; White & Watts, 1973).

Evaluating the successful components of such programs has been complicated by the fact that uniform and appropriate assessment procedures for measuring parental teaching behaviors have not been used. Instead, individual researchers and program developers have devised their own evaluation procedures (generally questionnaires or interviews) based on their personal philosophies of education and/or their own commitments to certain theoretical models of learning and development (Bissell, 1972; Goodson & Hess, 1975; Gordon, 1972). Unfortunately the theoretical models most often adopted are variations of social learning theory models which emphasize the effects of parents on children, without recognizing the reciprocity of parent/child interactions, and support mechanistic stimulus-response and reinforcement techniques for promoting learning, rather than organismic, self-activating, and constructive approaches. Furthermore, reliance on these conceptual frameworks seems to result in a pervasive conviction that measurable cognitive differences between groups of children are generally attributable to environmental deficits that are associated with socialization strategies utilized by mothers (Bee, Van Egeren, Streissguth, Nyman, & Leckie, 1969; Hess, Shipman, Brophy, & Bear, 1968; White, Watt, Barnett, Kaban, Marmor, & Shapiro, 1973).

In a great many instances the same theoretical biases that have determined the goals and the curricula provided for parents and children have also determined the foci of observation systems designed to assess changes in parental teaching behaviors that can be attributed to participation in particular preschool intervention programs (Goodson & Hess, 1975; Kahn, 1976; Karnes & Teska, 1975). Reviews of those systems that are available for evaluating parents and/or teachers' interactions with children revealed that they generally reflect developmental models based on social learning and language deficit theories, but did not focus on cognitive behaviors (Gordon & Jester, 1973; Kahn, 1976, Lytton, 1971). Recent research on parent/child interactions, cognitive development, sociolinguistic variations, and early language acquisition have provided new theoretical conceptualizations and alternative models of development. These need to be considered before appropriate parent training programs and preschool curricula can be developed to effectively meet, not only the special needs, but also the special goals of targeted populations (Horowitz, 1970).

This author is convinced that the development of appropriate curricula and meaningful evaluation procedures can take place only after the various components of preschool programs have been adequately investigated. This author also firmly believes that one does not have the right to disrupt parent/child relationships unless one has discovered more effective means for parents and children to achieve the goals of educational interventions. Therefore, this study was designed to investigate an important component of many preschool intervention programs: the utilization of parents as teachers of their own children. Several issues that directly relate to parent/child teaching interactions are of interest or concern and these have determined the specific design of the research being reported here.

One of the main concerns is that certain information, which is essential for the development of viable preschool intervention programs that involve parental participation, is not available. There is virtually no published research on the content of parent/child conversations: what are the actual topics referred to, how are new topics introduced, by whom, etc. In addition, the nature of the verbal-logical behaviors that are expressed during interactions between parents and preschoolers have not been explored adequately. The linguistic forms and communicative functions of these verbal-logical behaviors are accessible and can be investigated by systematically observing their occurrence under a variety of conditions. How the content and verbal-logical behaviors are evoked and how they progress in relationship to children's sex and their developmental levels, as well as the context in which they occur, are questions which need to be investigated before adequate programs can be developed to help parents enhance their capacities to teach their own preschool children.

There has been some research which focuses on maternal teaching styles and relates these to children's cognitive behaviors (Bee, Van Egeran, Streissguth, Nyman, & Leckie, 1969; Dolley, 1974; Hess, Shipman, Brophy, & Bear, 1968; Mercurio, & Safford, note 3; Shipman, 1971). In addition, within the past few years, research focusing on linguistic behaviors during mother/child interactions has been actively pursued (Cross, 1977; Gleason & Weintraub, 1979, Newport, 1976; Newport, Gleitman, & Gleitman, 1977; Phillips, 1973;

Snow, 1972, 1977).

On the other hand, critics have commented on the almost total lack of any research on fathers interacting with preschoolers (Earls, 1976; Lamb, 1976; Lynn, 1974). With the exception of the work of Norma Radin and her associates (1976), the relationship between observed father/child interactions with young children and the cognitive development of those children generally has been overlooked. Gleason and Weintraub (1979) have included father/child interactions in their latest observational research and their preliminary results are available and encouraging; however, their focus is more on issues relating to language acquisition than to teaching or learning per se.

In order to develop effective family centered intervention programs for preschool children with special needs, it is important to understand the range of behaviors that occur when parents teach their normally developing children, as well as to study the behaviors that occur when parents function, under less ideal conditions, as teachers of their developmentally delayed children. Obviously there will be similarities as well as differences in the content and verbal-logical behaviors that can be observed. The similarities and differences that can be expected must be determined before evaluations of the appropriateness of observed interactive behaviors, or changes in behavior observed over time, are attributed to the inputs of any intervention program.

It is clear that there is a lack of base line data which would allow us to compare the behaviors that occur when particular parents, or groups of parents, are consciously trying to teach their children. It therefore, seems reasonable to advocate that before developing and disseminating curricula for model preschool programs that train parents as teachers of their own developmentally delayed or disadvantaged children and/or as para-professional trainers of subsequent parent populations, that the actual behaviors that occur during educationally oriented parent/child interactions are observed and described. Exploring the relationships of the behaviors of each of the participants vis-a-vis one another, and of how those behaviors relate to any specific performance objectives, should provide a basis for determining what parents already know, or do not know, about how to teach their own children.

Furthermore, systematic observations of parents teaching their own children should disclose a potpourri of behaviors that seem effective in particular circumstances. These behavioral strategies could then be offered as supplements or alternatives to parents who are interested in, or have demonstrated a need for expanding their repertoire of teaching behaviors.

Ultimately, if appropriate observation systems are perfected, they could also be utilized to assess and document changes in parental teaching behaviors that are attributable to the input provided by particular parent training programs.

The complexity and circumspect nature of human interactions is always a serious problem for observers (Kerlinger, 1973; Medley & Mitzel, 1963). A vantage point based on theoretical considerations is essential for focusing any observational research (Dunkin & Biddle, 1974). The vantage point chosen for this study is derived from several different theories, each of which touches upon different aspects of parent/child teaching interactions. The theories which have guided the design of this research are theories which address themselves to ecological issues, cognitive-developmental issues, and to the dialectical and reciprocal nature of human interactions.

Regardless of their disciplines and fields of interest, people concerned with understanding human behavior are increasingly recognizing that the observable behaviors of individuals, and or groups of individuals, are influenced by a variety of ecological factors (Bell & Harper, 1977; Feagans, 1972; Gump, 1964, 1975; Jones, 1972; Kounin, 1970, 1975; Laing, 1967; Pappanikou, 1977; Redl & Wineman, 1957; Reigel, 1979; Sarason, 1971; Schopler & Reichler, 1971). Although socio-economic status has been related to variations in behaviors observed during mother/child interactions (Bee et al., 1969; Hess et al., 1968), there are a great many more ecological variables whose influences need to be recognized and clarified before parent/child teaching interactions can be fully understood or evaluated.

An ecological variable that is particularly relevant for teaching interactions is the actual activity that is taking place. The organizational, behavioral, and/or task objectives of the activity create an environmental system which influences the behavior of the participants in that activity (Bell & Harper, 1977; Gump, 1964; Kounin, 1975). The rules of the game, so to speak, and the specific subject matter emphasized during an activity are contingent on the projected outcome of the activity. Therefore, it can be expect that the format for activities which do not require the completion of tangible objectives would be different from the format for activities which require the completion of a prescribed task (Bell, 1964; Lytton, 1971; Schaffer & Crook, 1979). Most observations of parent/child interactions have been limited to either "free play" situations, or to situations in which the tasks to be completed are prescribed. Both types of situations must be observed in order to have an adequate opportunity for observing the array of behaviors available to the participants. It is for this reason that our parent/child dyads were asked to engage in two types of teaching activities: (1) a semi-structured activity and (2) a structured activity.

Another important ecological variable, which also has ethical ramifications, is that of preconceived or assigned roles. Educational interactions and the behaviors observed during such interactions are influenced by the roles which each of the participants assume during their interactions (Katz, 1970). On the one hand, the activity being engaged in and the status of participants vis-a-vis each other, determines how they will enact their roles (Kounin, 1975). In addition, each participant's concept of his or her appropriate role shapes the progress and direction of any interaction they participate in. In addition, any preconception, by individuals, of the behaviors that are considered appropriate in a given situation acts as an ecological variable affecting the behaviors they exhibit. More specifically, it seems apparent that the ostensible purposes and objectives of an interaction, as conveyed by the researcher, would have an influence on how parents proceed to interact with their children. Yet generally, when parent/child interactions have been observed, parents have not been informed that their behavior, as well as their child's behavior, was under scrutiny.

In essence, the opportunity to discover the potential of parents as teachers has not been exploited. If the ultimate goal is to implement effective parent training programs it is essential that one not only observe how parents and children usually interact with one another, but also how they can interact. Unless parents are informed that they are being evaluated as teachers of their children, one can not be sure that one has sampled all the skills and behaviors the parents already possess; nor can one be sure that the training programs that are provided have supplemented and/or enhanced parental teaching skills.

Like Sroufe (1970), this author is particularly concerned that rash interpretations of research on parent/child interactions, although conducted by well-meaning professionals. can have grave consequences for policy-making. Lack of information about the implicit goals of the research they are participating in is especially likely to interfere with the capacity of parents from minority and economically disadvantaged circumstances to adequately demonstrate the skills they have available (Sroufe, 1970). In much the same way, parents interacting with their developmentally delayed youngsters are also functioning at a disadvantage and, unless previously informed that their behavior is under scrutiny, may choose to limit their efforts to demonstrate their interactive capacities. Therefore, for this study, parents were informed that the observations that were being made were focusing both on their behaviors and on their childrens' behaviors.

Piaget's theory of cognitive development was relied upon for investigating the content of educationally oriented parent/child interactions. This theory is particularly appealing because it is a stage theory that recognizes and respects the individual's active participation in his or her own cognitive development. Using a framework of Piagetian theory it was possible to examine the particular areas of knowledge expressed in the topics of conversations between parents and children, and to relate them to: (1) the structure of the activities being engaged in, (2) the verbal-logical behaviors expressed, and (3) the sex and developmental levels of the children. The analyses of the substantive content expressed during parent/child interactions necessitated the development of a system for coding the topics of conversation in terms of the areas of knowledge that Piaget considers as vital precursors to later operational proficiency.

The relationship between the verbal-logic behaviors expressed by parents and by their children during teaching interactions, is a major concern of this study. Prior to investigating this relationship the behaviors that were to be examined needed to be specified. Although there were no appropriate observation systems or theoretical guidelines for determining the verbal-logical behaviors that parents and children might demonstrate during teaching interactions, there were some observation systems available which had been used successfully to analyze the discourse observed in classrooms. A major portion of the behaviors occurring during interactions between parents and preschoolers are, like teacher/pupil interactions, verbal in nature. It has been shown that the verbal-logical behaviors occurring in classrooms can be analyzed and that some of the underlying cognitive process can be reliably inferred (Bellack, Kliebard, Hyman, & Smith, 1966; Gallagher & Ascher, 1974; Good & Brophy, 1969; Honig, Caldwell, & Tannenbaum, 1970; Katz, 1968; Meux & Smith, 1964; Smith & Meux, 1970; Taba, 1970). Therefore, it seemed reasonable to assume that the procedures used for observing teacher/pupil interactions could be replicated during educationally oriented parent/child non-classroom situations.

In the chapter which follows the need for appropriate instrumentation for systematically observing parents as they teach their preschool children is demonstrated, and the results of studies that are relevant for an understanding of parent/child teaching/learning interactions are reviewed.

Chapter II

REVIEW OF THE LITERATURE AND HYPOTHESES

As a life-span perspective rapidly encroaches on the field of education, formal education is being advocated for a clientele that is increasingly more diverse in terms of age and capabilities. At present, legislation combined with societal pressures have decreed that preschool intervention programs are essential for children with special needs (DeWeerd, 1977), and that parent participation in these educational efforts is particularly desirable since it seems to enhance the probability that the projected outcomes will be accomplished (Beller, 1973; Bronfenbrenner, 1974; Goodson & Hess, 1975; Karnes & Teska, 1975; Schaefer, 1972).

The use of parents as adjunct teachers, or as co-teachers, of their own children is the major component of a number of the more successful preschool intervention programs (Gordon & Jester, 1973; Gray & Klaus, 1970; Levenstein, 1977; Schaefer & Aaronson, 1972; Shearer & Shearer, 1977). However, before the effectiveness of such efforts can be understood or evaluated parent/child teaching/learning interactions must be systematically observed under various conditions and these interactions must be adequately described.

In the first part of this chapter the impetus for establishing preschool intervention programs is briefly outlined. The results of studies that evaluated these programs is then summarized and the need for alternative evaluation instruments, particularly systems for directly observing parent/child educationally oriented interactions, is emphasized. The results of observational studies that appear to be relevant for furthering an understanding of how parents and their preschool children function during teaching/learning interactions are reviewed in the second section of this chapter.

The Need for Alternative Instrumentation

Whenever the education of a nation's youth is formalized, humanistically-oriented groups emerge whose overriding goal is to utilize the educational system to create changes in the society. In recent times, such groups, viewing children as one of the nation's most important natural resources, have supported the establishment of preschool programs, initially for economically disadvantaged children, and more recently for handicapped children (Meier, note 2; Weinberg, 1979).

Much of the interest in preschool intervention was spurred on by researchers who had suggested that children with lower socio-economic status (SES) had cognitive deficits which could be attributed to their exposure, via interactions with their mothers, to language patterns which were not elaborate or complex enough to provide the degree of specificity of information that was necessary for acquiring preacademic cognitive skills (Bee, et al., 1969; Hess & Shipman, 1965; Madden, Levenstein, & Levenstein, 1976). In addition, these researchers indicated that the "teaching styles", which lower SES mothers and mothers of handicapped children used, placed too great an emphasis on exerting overt control over their children's actions; and that they relied more on their parental authority, rather than on rational explanations and encouragement, in guiding their children through the completion of various experimental tasks (Bee et al., 1969; Brophy, 1970; Hess, et al., 1968; Kogan & Wimberger, 1969; Kogan & Tyler, 1973; Shere & Kastenbaum, 1966).

Based on these results, and on the results of various other studies, it was concluded that educational intervention was necessary to counteract environmentally induced disadvantages. The hope was that if stimulating materials and innovative and creative teaching techniques were provided, children would emerge from this optimal learning environment, if not "cured" of their educational deficits, then well on the road to recovery.

Encouraged by a receptive political climate, the preschool movement and related research efforts have rapidly expanded during the past decade (Caldwell, 1974; Weinberg, 1979). To date, however, efforts to validate the long-term effectiveness of different types of preschool interventions, specific preschool curricula, or the teaching strategies utilized with preschoolers have been inconclusive (Ambron, 1977; Bissell, 1973; Bronfenbrenner, 1974; Day, 1977; Good, Biddle & Brophy, 1975; Goodlad, 1973; Goodson & Hess, 1975).

Various factors have been cited to explain why evaluators have not been able to document clearly the advantages of a preschool education. Some have concluded that the inability to benefit from early educational interventions is basically attributable to the pervasive and intractable nature of biological endowments (Jensen, 1969; Stanley, 1973). It has also been suggested that, in the initial optimism that was generated, the impact of the proportion of adverse environmental conditions, in comparison to the limited scope of early intervention efforts, had been grossly underestimated (Caldwell, 1974; Hunt, 1979; Good, Biddle & Brophy, 1975). On what could be considered a more optimistic note, critics have stressed that, in numerous cases, methodological shortcomings and weak conceptual foundations have undermined the implementation of early intervention programs and their subsequent evaluation procedures (Amtron, 1977; Anderson, 1973; Bissell, 1973; Bronfenbrenner, 1974; Goodlad, 1973; Goodson & Hess, 1975; Kamii, 1971, 1972; Stallings & Kasowitz, 1974; Stanley, 1973). More specifically, it has been stated that evaluation efforts have been hampered by reliance on a narrow range of measurement procedures and that program evaluators have relied too heavily on the gains in children's scores on standardized normative tests of intellectual achievement, such as the Stanford-Binet and the Peabody Picture Vocabulary Test (Bronfenbrenner, 1974; Goodson & Hess, 1975; Karnes & Teska, 1975; Zigler & Trickett, 1976).

Although in general IQ test score gains have been substantiated in favor of the children who participated in the preschool programs for the disadvantaged, most of these gains have not withstood the test of time (Bronfenbrenner, 1974; Karnes & Teska, 1975). In addition, reliance on group IQ test score differences makes it impossible to determine which of the components of a preschool program were effective for the development of specific skills. As a result, clear-cut guidelines for evaluating or supporting the development of appropriate preschool curricula or parent training procedures have not been forthcoming. Equally important is the fact that group test differences overlook the benefits that may have accrued to individual children, or to specific subsets of children within the total sample. Therefore, programs which might have proved effective for certain children may have been prematurely discarded (Anderson, 1970; Karnes & Teska, 1975; Keogh & Becker, 1973; Lambie, Bond & Weikart, 1974; Meier, note 2).

Even though the "cost effectiveness" and the <u>ultimate</u> success of preschool interventions has not yet been clearly substantiated, certain preschool programs have been able to document sustained increases in scores on standardized IQ tests, and have provided data indicating that they accomplished those objectives which they specifically outlined for their own programs (Beller, 1973; Bissell, 1973; Bronfenbrenner, 1974; Goodson & Hess, 1975). Furthermore, recent longitudinal studies are uncovering effects which indicate that early interventions may have served a preventative role by keeping participating children from falling behind in their school achievement, and/or alleviated their need for special educational interventions in the elementary schools (Beller, 1973; Hunt, 1979; Meier, note 2; Weikart, 1975).

Those programs which were able to demonstrate their success have been characterized by two important design components. The first component was the use of a planned and structured curriculum which included specific objectives and clearly delineated strategies for their implementation. The specific theoretical orientation or the values underlying those objectives apparently had no significant relationship to children's gain scores. David Weikart, (Weikart, 1969 cited in Weikart & Lambie, 1970) in an effort to determine the effectiveness of two established and highly structured preschool programs, compared these to a program which was modeled after traditional nursery school programs. He found that even after two years, the type of curriculum being used did not have a significant influence on any of the measures used to evaluate changes in the growth and development of the participating children. More recently Gray and Wanderman (1980) reported that The Consortium on Longitudinal Studies found that, for the various programs they were evaluating,

> ...the number of hours per week of intervention, the length of time (e.g., 1 year vs. 2 years), or the particular curriculum makes little difference in the outcomes as measured largely by achievement indices. (p.999)

An important implication of these results is that the type of content being emphasized and the type of structure being provided do not appear to be crucial variables: and therefore, no one curriculum needs to be ridgidly adhered to. Instead the content and structure of curriculums could be tailored to the needs of the families that are participating in any program.

The second component which the successful programs incorporated was some form of parental involvement, even though the degree and type of involvement by parents has varied considerably from program to program (Bissell, 1973; Bronfenbrenner, 1974; Goodson & Hess, 1975; Meier, note 2). The term "involvement" has been used to mean anything from parent group meetings designed to disseminate child development information, to direct training of mothers as teachers of their own children (Day, 1977; Goodson & Hess, 1975). Only a few preschool program evaluations, regardless of the degree of parent involvement that they subscribe to, have included direct observations of mother/child interactions as a part of their evaluation procedure (Gordon & Jester, 1972; Levenstein, 1970; Mercurio & Safford, note 3). Furthermore, when observed behaviors have been assessed, the emphasis has generally been on demonstrating that changes in maternal behaviors (usually the use of verbal reinforcement and encouragement, and/or the syntactical complexity and variation of the mother's language patterns) are related to increases in children's scores on standardized IQ tests. Observed changes in children's cognitive behaviors, attitudes, or motivations have not been systematically measured and related to observed changes in mothers' cognitive behaviors, attitudes, or motivations (Gordon & Jester, 1973; Gray & Wandersman, 1980; Karnes & Teska, 1975; Streissguth & Bee, 1972).

Since the efficacy of relying on standardized test scores for evaluating the outcomes of preschool programs has been seriously questioned, support has grown for supplementing educational evaluation procedures with criterion-referenced tests based on program objectives and with direct observations of the children being evaluated. The impetus for using observational studies has gained momentum as researchers have come to recognize that the instruments that had been used to assess the influence of parents (questionnaires, interviews, and standardized tests) are not sufficient for answering questions about the effects that ongoing interactive behaviors have on children's cognitive development. Furthermore, most of the studies, which had not directly observed the actual behaviors they hoped to investigate, resulted in the kinds of broad generalizations and platitudes that are a characteristic of much of the "effectiveness" literature, and which obscure the very behaviors that need to be taken into account (Clarke-Stewart, 1978b; Honig, Caldwell, & Tannenbaum, 1970, 1973).

It has also been suggested that both the summative and the formative evaluation procedures of preschool programs could be greatly enhanced if observation system were used that focused specifically on the socio-emotional and/or on the cognitive processes that occur while parents, and/or teachers, are interacting with young children (Bissell, 1973; Gordon & Jester, 1973; Gray & Wanderman, 1980; Honig, Caldwell, & Tannenbaum, 1970; Kamii, 1971; Karnes & Teska, 1975; Sigel & Olmsted, 1968; Streissguth & Bee, 1972; Webb, 1974).

In summary, the literature indicates that alternative methods for evaluating the growth and development of children who participate in intervention programs need to be utilized. Instruments developed for systematically observing teaching/learning activities that involve children interacting with their parents, or teachers, should be designed to focus on specific behaviors associated with the cognitive and socio-emotional processes that are presumed to be influenced by such interactions.

Observations of Parent/Child Interactions

Over the past 30 years the number of research studies utilizing systematic observations of parent/child teaching/learning interactions have increased steadily (Boyer, Simon, & Karafin, 1973; Lytton, 1971; Simon & Boyer, 1974). Initially much of the research involving direct observations of adults interacting with children produced significant findings by using relatively vague global categories for identifying or rating "style" (e.g., flexible, warm, controlling, indirect, authoritarian, stimulating), behavioral modes (e.g., talks, praises, criticizes, demands, asks questions), demographic variables (e.g., sex, age, number of siblings) and presage variables (e.g., socio-economic status, number of toys in home, how often child is read to). However, it became increasingly clear that such findings could not be translated into the content or specific skills that were needed for developing programs that train classroom teachers or parent-teachers (Biddle & Elena, 1964; Dunkin & Biddle, 1974; Gordon & Jester, 1973; Rosenshine & Furst, 1971; Smith, 1971; Streissguth & Bee, 1972).

More recently, the use of precise, operationally defined, observable, behavioral variables has been advocated by many researchers as the preferred method for uncovering the nature of process-process and/or process-product relationships; particularly since their use increases the likelihood that findings can be replicated. (Blurton-Jones, 1972; Jones, Reid, & Patterson, 1975; McGrew, 1972; Patterson, 1974). It has also been suggested that combinations of high and low inference variables, which can subsequently be grouped into composite patterns or factors, as well as the use of a variety of procedures for assessing different types of relevant behaviors (e.g., interview, standardized tests, and direct observations) results in a more comprehensive understanding of the interactive processes that are involved in enhancing or facilitating children's development and achievement (Baumrind & Black, 1967; Clarke-Stewart, VanderStroep, & Killian, 1979; Gray &

Wanderman, 1980; Lamb, 1976a; Rosenshine & Furst, 1973; Smith, 1971; Soar, 1972).

For purposes of this review, most of the research that will be described involves direct observations of parents interacting with their preschool children. The main focus will be on those interaction studies which have elicited parental teaching behaviors. However, since much of the relevant research has not stressed an interactionist perspective the results of observational studies of parents and younger children (0 through 30 months) will be summarized briefly. Although these studies do not directly promote a fuller understanding of how teaching/learning experiences between parents and their children are enacted, they do provide considerable relevant information. Furthermore, these studies have all clearly demonstrated the importance and the advantages of focusing on the reciprocity of the patterns of behaviors that are observed.

Parents and their young infants

Once the various competencies of infants as discriminators and manipulators of their environments had been documented (Bell, 1971; 1974; Bell & Harper, 1977; Bower, 1974; Eimas, Siqueland, Jusczyk, & Vigorito, 1971; Harper, 1975; Kessen, 1966; Korner, 1971; Morse, 1972, 1974;

Moss, 1967) observations of parent/infant dyads focused much of their attention on the reciprocity of various behaviors that mothers and their infants engage in. In general, these studies of parent/infant interactions have found that competent infants (i.e., infants whose test scores and observed behaviors indicate that they are achieving and developing adequate skills in areas that are related to cognitive development) have loving mothers who are sensitive to their infants' needs, who make consistent efforts to provide adequate visual, auditory, and tactile stimulation, who allow them freedom to explore, and whose vocalizations and verbalizations are contingent on their infants vocalizations and/or gaze. The temperaments, emotional states, intellectual capacities, and physical health of mothers of competent infants are within the normal range for adults (i.e., their mothers are not irratic, psychotic, depressed, physically, or mentally handicapped, etc.). Competent infants have mothers who develop a positive reciprocally interactive relationship with their babies (Bell & Ainsworth, 1972; Bowlby, 1969; Brazelton, Kowlowski, & Main, 1974; Clarke-Stewart, 1973, 1977; Rutter, 1972; Stern, 1974a).

On the other hand, mothers who have been observed to be competent caregivers have infants who are adequately responsive to stimulation, and who initiate social interactions with body movements, visual gaze, vocalizations, and appropriate affective expressions (e.g., smiling, crying, frowning). The temperaments, emotional states, and physical health of these infants are within a normal developmental range (i.e., these infants do not exhibited prolonged excessive irritability, hyperactivity, hypoactivity, gaze aversion, physical deformities, eating difficulties, etc.). Competent maternal caregivers have infants who develop a positive reciprocally interactive relationship with their mothers (Bell, 1971; Bell & Harper, 1977; Brazelton, Koslowski, & Main, 1974; Chess, 1967; Clarke-Stewart, 1973, 1977; Escalona, 1969, 1973; Fraiberg, 1974; Lewis and Rosenblum, 1974; Moss, 1967; Osofsky & Connors 1979; Stern, 1974a).

Although there are still relatively few observational studies involving fathers and their young infants, those studies which have observed fathers interacting with their young children have been productive and provocative (Lamb, 1976a; Lynn, 1974; Parke, 1979). In general, these studies have concentrated on making comparisons between the interactive behaviors of mother/child dyads versus father/child dyads during brief semi-structured dyadic, and occasionally triadic, situations in homes or laboratory settings (Clarke-Stewart, 1978; Kotelchuck, 1976; Lamb 1976a).

Observations of fathers and young infants have demonstrated that fathers are interested in, and capable of nurturing and stimulating their newborn children (see Parke, 1979 for a complete review). From the limited research that is available, it appears that fathers become excited about their wives' pregnancies and about the birth of their children. Like mothers, if given the opportunity, fathers will spontaneously interact with their young children and be responsive to their needs (Greenberg & Morris, 1974; Parke, 1979).

Precisely how the behaviors observed during father/child interactions influence their children's development has not been clearly delineated. Nevertheless, results from several studies suggest that for young infants and toddlers measures of paternal involvement, nurturance, stimulation, and encouragement, (although not necessarily expressed in the same form or context as maternal involvement warmth, stimulation, and encouragement), are positively related to their children's sex-role adoption, their moral development, their socio-emotional well-being, and their cognitive functioning (Biller, 1971; Clarke-Stewart, 1977, 1978; Greif, 1976; Lamb, 1976a, 1976b; Lewis & Weinraub, 1976; Lynn, 1974; Parke, 1979; Radin, 1976). It has also been suggested that fathers' influence may not be as direct as mothers', that it may be mediated through the mother, and that the marital relationship may have a significant impact on each partners success as a parent. (Belsky, 1981; Clarke-

Stewart, 1978; Heath, 1976; Patterson, 1980). Furthermore, it appears that fathers, like mothers, experience significant psychological stress when they have fathered a mentally retarded or chronically ill child. (Cummings, 1976).

Nevertheless, it still appears that mothers are assuming the major responsibility for caregiving and that most of their interactions with their young infants occur in the context of caregiving activities. Fathers, for the most part, engage in far less caregiving and most of their interactions with their infants occur in the context of play activities. (Clarke-Stewart, 1978a; Lewis & Weinraub, 1976; Parke, 1979).

Although the similarities in parents' behaviors towards their children and in children's behaviors towards their parents appear to far outweigh the differences, certain interesting differences have been reported. Younger infants, particularly during stressful situations (e.g., stranger situations in laboratories), are more likely to seek out their mothers (Clarke-Stewart, 1978a; Lamb, 1976b; Koltelchuck, 1976;). As they get older (CA 12 months to 24 months) they demonstrate their attachment to both parents and indicate that they prefer their parents to a benign stranger (Lamb, 1977; Schaffer & Emerson, 1964; Weinraub & Frankel, 1977). It has also been reported that children in this age group are more likely to initiate play activities with their fathers than with their mothers and that during structured situations they frequently indicate a preference for fathers as playmates (Kotelchuck, 1976; Lamb, 1976a; Clarke-Stewart, 1978a).

Same-sex and cross-sex relationships have been observed during father/infant and during mother/infant play interactions. When compared to mothers, fathers tend to engage in more visual and tactile stimulation of their infants, but in less verbal stimulation. Fathers also seem to engage in stimulating their infant sons somewhat more frequently than they engage in stimulating their infant daughters, across all types of stimulation. On the other hand, mothers also seem to stimulate their same-sex infants more than their opposite-sex infants (Parke & O'Leary cited in Parke, 1979; Rebelsky & Hanks, 1972;). However, in the first few weeks of life mothers have been observed to interact more frequently by caregiving or stimulating their sons, probably because male infants tend to be more active and irritable during that period (Moss, 1967).

Parents and toddlers.

During the toddler state (CA 18 months to 30 months) mothers' caregiving interactions decrease and fathers' play interactions appear to increase. Differences in the play behavior of parents interacting with toddlers have been observed in several recent studies. Weinraub and Frankel (1977) observed 20 toddlers as they interacted with their mothers and with their fathers during a free-play situation. They found that the specific types of play behaviors of fathers and mothers did not differ significantly. Furthermore, the play behaviors of boy and girl toddlers were also similar. Nevertheless, the quantity of interactive play behaviors (e.g., getting on the floor, talk to, and sharing in the play of the child) did increase when parents were observed with a same sex toddler. Weinraub and Frankel indicate that their results also suggested that there were some qualitative differences in the play styles of mothers and fathers.

Clarke-Stewart (1978a) observed 14, 30-months-old toddlers. She noted that fathers' play style appeared to involve a pattern of praising the child and engaging in social-physical activities, rather than intellectual activities or tasks involving interactions with objects. The play "episodes" between father/child dyads tended to be briefer that those that occurred between mother/child dyads. Interestingly, fathers who played with their children frequently also exhibited more negative affect. (However it is not clear from her descriptions if this negative affect had a teasing psuedoaggressive flavor or if it had a more punitive, disparaging flavor.) Clarke-Stewart concluded that parents only differed qualitatively when they engaged their children in physical or social play, or in a game (i.e., "social play"). However, during all her other observations quantitative rather than qualitative differences marked the behavior of parents vis-a-vis their toddlers. Clarke-Stewart summarized these behaviors as follows:

> In natural observations, mothers were observed to be more interactive than fathers in amounts of verbalization, physical contact, and play with toys; but they were not different from fathers in measures of responsivness, stimulatingness, affection, or effectiveness, or in the patterns of intercorrelations among their behaviors (except as mentioned, for social play). (p.476)

In the last 15 years there has been increasing interest in studying the interaction between mother's verbal behaviors and the early language acquisition skills of their children (Brown, 1973; Snow & Ferguson, 1977). Although most of this research involves toddlers it does have implications for understanding how parents teach, even when they may not be consciously trying to. Most of this research has involved the use of direct observation of mother/child and occasionally father/child interactions in home or laboratory settings. These efforts have been directed towards searching for the links between adults' (usually mothers) input language and the language skills of the children they are interacting with.

The results of these interactive language studies indicate that mothers (Newport, Gleitman, & Gleitman, 1977; Snow, 1977), fathers (Gleason & Weintraub, 1979; Golinkoff & Ames, 1979; Weintraub, note 4), and even preschoolers (Schachter, Kirshner, Klips, Fredricks, & Sanders, 1974; Shatz & Gelman, 1977) facilitate the acquisition of language by modifying the input language they use when they interact with young children. In general, speakers adjust the rate, the pitch, and the complexity of their language so that it closely approximates the language level of the young listener while still being sufficiently advanced enough to challenge the young child to continue to acquire new language skills and learn new language rules. Parents interacting with young children also tend to limit the content of their language by focusing their conversation on the here-and-now. By continuing to introduce increasingly more complex linguistic forms during dialogues, parents provide a linguistic environment which only gradually approximates adult verbal interactions (Bellinger, 1979; Gleason & Weintraub, 1979; Messer, 1978; Moerk, 1976; Nelson, 1973; Newport, Gleitman, & Gleitman, 1977; Snow, 1977).

Some of these parental linguistic modifications (e.g., brief utterances, frequent self-repetitions, expansions of children's utterances) have been interpreted as "teaching" strategies that are related to the rate at which children acquire language, as well as to the linguistic and cognitive skills of child-listeners (Furrow, Nelson, & Benedict, 1979; Gleason & Weintraub, 1979; Moerk, 1976; Nelson, 1973; Newport, Gleitman, & Gleitman, 1977; Shatz, 1978; Shatz & Gelman, 1977).

Although the reciprocal influence of the child's cognitive capacity on the language behavior of the mother is being recognized, interpretations of results still tend to emphasize how the language behavior of mothers influences the mastery of linguistic skill by their children. However, there are indications that children also utilize strategies to help themselves master their language. These strategies (e.g., imitation, listening, labeling objects, using stereotype phrases) are reflected in the form and content of their language. Children's language learning strategies are related to the function their language expresses (i.e., referential or social-expressive) and to their levels of language and cognitive development (Cross, 1977; Furrow, Nelson, & Benedict, 1979; Nelson, 1973; Schachter et al., 1974).

Gleason (1977) and Moerk (1976) have suggested that the language performance of young children provides their parents with essential clues about the level of development their children have achieved (i.e., their linguistic and cognitive competence). The verbal feedback behavior of the child enables the parent to infer their child's information-processing skills and more global capacities and thereby appropriately calibrate the input language they address to their child.

It is possible that the parental "teaching" which is not consciously planned, but does result in creating a linguistic environment that is conducive for language acquisition, may actually be in the service of a larger goal: that of enhancing and facilitating children's cognitive development. Interest in that more comprehensive goal, rather than in teaching language per se, may determine how parent's engage their children in interactions which involve verbal behaviors. By the same token, for children, learning language may be a means rather than an end (Piaget, 1955: 1962). Children, who are striving to understand the world around them, may work at the task of learning language because language is an essential tool for more complex learning. (Vygotsky, 1934/1962).

Throughout the parent/child interaction literature an issue that keeps recurring is how parents control their children or influence them to comply with their demands and/or values. As the reciprocity of parent/child behaviors has been emphasized, observational studies have been used to investigated the antecedent contingencies involved in control-compliance interactions.

Lytton and Zwirner (1975) observed 136 2 1/2-year-olds boys in a natural home situation on two different occasions. They found children complied more to their fathers, who also offered less commands, than to their mothers, who, by virtue of the time they spent with their children, uttered more commands. For both parents compliance was most likely to occur after a parental suggestion. Compliance decreased when commands were given and decreased even more when reasoning was attempted. Parental command-prohibitions and reasoning antecedents were most likely to result in overt noncompliance. In terms of nonverbal parental behaviors, both children's compliance and their noncompliance were facilitated by parents' use of, in decreasing order, physical control, negative action, positive action, and neutral action. Parents' use of physical control and negative action had a more powerful facilitating effect on noncompliance than on compliance. On the other hand, positive and neutral actions were more likely to elicit compliance than noncompliance.

Using Hoffman's (1970, 1975) terminology, Lytton and Zwirner emphasized that while "power assertion" strategies by parents seem more effective in the short run, a multiple regression analysis, with selected mother and father behaviors as the predictors, indicated that power assertion tactics by either parent were negatively associated with a criterion of compliance by the child. They suggested that for long term internalization cognitively oriented control strategies were more effective.

In a follow-up study, Lytton (1979) analyzed the second-order antecedents that influenced the behaviors of the previously observed sample. Compliance was most likely to occur when command-prohibitions were accompanied by positive actions (e.g., smiling, hugging, playing with the child, etc.) and it was more likely to occur when parents only offered command-prohibitions than when they accompanied these commands with physical controls (e.g., restraining, slapping, etc.).

Lytton indicated that, in general, parental responses to their children's compliance were "neither particularly reinforcing for compliance nor punishing for noncompliance" (p.266). Although both parents seem to use similar disciplinary approaches, mothers assumed the major responsibility for interfering with their children's actions. Nevertheless, the physical presence of the father enhanced the chances that mother would be complied with. Although mothers were more likely to react to their children's compliance or noncompliance, the most frequent parental behavior was no response, regardless of whether the child had complied or had not complied. He concluded that "in natural encounters, the control system seems somewhat erratic" (p.265).

Like Lytton, Schaffer and Crook (1979) have been investigating how parents exert control over their toddlers. They have observed the interactions between mothers and their toddlers during a brief structured laboratory play session. Although they found that in this directed play situation, much of the mother's speech to her child functioned to maintain or achieve control, they also found that it was frequently expressed in a indirect manner and that these controlling efforts tended to be sensitively timed to coordinate with the child's attention and actions. They pointed out that their results suggest that there are a variety of techniques which parents can use to elicit compliance from their children. These control function techniques do not have to involve the use of force or coercion and they do not necessarily result in disharmonious interactions.

Parents and Preschoolers

In reviewing the literature it became apparent that there were actually relatively few studies that involved direct observations of parents teaching their normally developing, or their developmentally delayed preschool children (CA 3 to 5 years of age). Therefore some studies were included in this review even though they did not directly address the issue of how observed parent/child teaching/learning interactions transpire. The studies that are reviewed have been grouped in terms of the children's characteristics. The first set of studies all involved normally developing children. The second set of studies compared economically disadvantage dyads to middle-class dyads. The last set of studies contain observations of mothers interacting with their physically or mentally handicapped children.

Parents and normally developing preschoolers.

Bishop (1951) appears to have been the first, and for a while the only one, who made any effort to observe maternal teaching behavior during interactions with normally developing children. (See Lytton, 1971 for a thorough review.) Bishop's results foreshadowed a lot of the subsequent research and certain of her results are particularly relevant to the interests being pursued by the study reported in chapters 3 and 4. Although her main interest was in interactions that either promoted dependency in children or that fostered independence, Bishop did include a category for coding maternal teaching. This category included attempts to inform the child in order to clarify or stimulate the free play of the child and/or efforts to teach by using "structurizing", a technique defined as "M facilitates activity on the part of C by methods which stimulate independent thinking and relegate the responsibility of decision to C" (Bishop, 1951, p.6).

Bishop's first study (1951) indicated that mothers' behaviors was consistent over two separate half-hour free-play sessions and that children's noncooperative responses were related to their mother's use of "directing", "interfering", "criticizing", and "strong stimulation". For her next study[1] she created an experimental variation by telling half of the 30 mothers that during the first session their children had not adequately demonstrated their capabilities. As a result of this "motivation" mother's behaviors in the second session were indeed altered.

> These differences between the two sessions seem to indicate that a clearly structured motivation on the part of a mother to have her child realize his highest abilities, specifically when such abilities are being judged by a third person, results in a change in the quality of her interaction with the child. This change is characterized by an increased domination of the child as expressed in arbitrary directing of, and interference with, the child's activity. (Bishop, quoted in Boyer, Simon, & Karafin, 1973, p.387).

Furthermore, she found that under the experimental condition, mothers' teaching decreased and children's noncooperative behavior increased.

Diane Baumrind (1972, 1975), like Bishop, has not really been focusing on how parents teach their children, but rather on how they socialize them. She identified children

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[1] The results of her studies were only partially obtained from Bishop (1951). The rest of her results were obtained from the adaptations and excerpted portions of research reports Boyer, Simon, & Karafin, (1973).

who were considered to be socially competent on the basis of behaviors observed as they interacted in their nursery school and in laboratory settings. Parents' behaviors were assessed during home observations. Baumrind and her associates found that certain patterns of parental disciplining and general child-rearing practises were related to the competence traits that had been observed in children.

> In summary, these findings suggest that parental practises which are intellectually stimulating and to some extent tension-producing (socialization and maturity demands, punitiveness, firmness in disciplinary matters) are associated in the young child with various aspects of competence. Techniques which fostered self-reliance, whether by placing demands upon the child for self-control and high level performance or by encouraging independent action and decision-making, facilitated responsible, independent behavior. (Baumrind & Black, 1967, p.325)

Osofsky and O'Connell (1972) compared the behaviors of mothers and fathers as each interacted separately with their own 5 year old daughters. The laboratory observations were video taped as each parent assisted the child in completing a series of graded puzzles and later while each parent participated in a free-play session. Their results indicate that although fathers interacted less frequently with their children, they were more action oriented. Mothers, in contrast to fathers, tended to be more encouraging and supportive of their children's efforts. The dependency behaviors of the children were consistent regardless of which parent was present, but children did demonstrate more task specific behaviors in the presence of their fathers. When interacting with their mothers these young girls exhibited more interpersonal behaviors.

As part of a larger longitudinal study of ego and cognitive development, Buss (1981) investigated the relationship between the activity level of 117 five-year-olds and behaviors observed while they interacted with each of their parents on two separate occasions. Four different teaching tasks were assigned to the parents and after the session a 49-item Q sort procedure was used to describe the parent/child interactions and especially the teaching strategies that had been used. These behaviors were then correlated with the previously determined activity levels of the children. Comparing four combinations, mother-son, mother-daughter, father-son, and father-daughter, Buss found that:

> Parents of active children tend to get into power struggles with their children, to intrude physically into the tasks, and to have difficulties establishing good working relationships with their children. With the notable exception of the father-son combination, a sense of frustration and impatience permeates these interactions...the fathers of active sons make the teaching tasks more pleasant by dramatizing the teaching and by providing merriment. Interactions involving less active children were generally more peaceful, harmonious, and quiescent. (p.63)

Competent parents interactive behaviors vis-a-vis their preschool children (CA 4 1/2 to 6 years) were investigated by Mondell and Tyler (1981). Competent parents were defined in terms of their scores on tests and questionaires that measured the self-efficacy, the trust, and the active coping styles of parents. Parental behaviors were observed for 30 minutes and rated while parents were interacting with their children in a block building design activity and cooperatively completing some puzzles. Mondell and Tyler found that the more competent parents were also more highly educated, they offered their children significantly more indirect solutions, and they were rated as offering more helpful suggestions for problem solving. They also uttered fewer commands, were rated as demonstrating more warmth and delight during the inter ions, made more gestures of acceptance, and offered less verbal disapproval. Mondell and Tyler suggest that the parental personality assessment procedures they had used revealed parental attributes which were related to how parents interacted with their children and that the more competent parents were providing a more conducive atmosphere for their children's problem solving activities.

Robert D. Hess and his associates have been participating in a major cross-cultural study of processes adults use and how these are related to the cognitive socialization of preschool children (Hess, Dickson, Price, & Leong, 1979). As part of this study Dickson, Hess, Miyake, and Azuma (1979) investigated the predictive relationship of the accuracy of communication by mothers and their 4-year-old children's scores to a variety of standardized tests administered over a two year period.

The results (Dickson et al., 1979) indicated that although the communication styles of their Japanese and American samples differed, communication accuracy was positively related to children's test scores over time. The referential communication accuracy of mothers as they verbally guided their 4-year-old through a picture identification task, the referential communication accuracy of these children when they took a turn at guiding their mothers through the task, and the combined accuracy of the members of the dyads were positively correlated with each other and with these children's scores on standardized tests of school performance and IQ. administered when they were 5 and 6 years old. Dickson et al, suggested that "...communication accuracy deserves the careful scrutiny previously accorded communication style in research on parent-child interaction" (p.58).

The possibility that there are cross-sex and same-sex relationships in the behaviors of parent/child dyads had been suggested by numerous studies with younger children. McLaughlin, Schutz, and White (1980) investigated the possibility that the language behavior, particularly the use of imperatives, with older children (5-year-olds) would also be related to the sex of the parent and child who were interacting. They observed 24 parent child dyads who were engaged in a table game that parents had been instructed to explain to their children and then play with them. They found that fathers used imperatives significantly more frequently when interacting with sons than with daughters. Furthermore, directly controlling utterances, such as, imperatives, direct suggestion, and prompting questions were more frequently used by fathers than by mothers. Mothers, on the other hand, appeared to favor the use of indirectly controlling utterances, such as indirect suggestions, information questions, and rule clarifications, although they did not use significantly more of these than fathers. Complexity measures of parents' language were higher for cross-sex dyads and seem to be attributable to parents' tendency to spend more time explaining the task, at least at the beginning of the session, to their opposite-sex child, but they played more with their same-sex child. They also finished the game more quickly when they were interacting with their same-sex child. These results suggest that the sex of older preschool children and their parents may influence their dyadic interactions and that further research is needed to clarify these effects.

Middle class mothers versus lower-class mothers.

When the issues of socio-economic status differences and the relationship of these differences to the educability of young children first gained attention, interest in observing mothers actually teaching their children was activated and several studies were undertaken. These studies were influenced primarily by social learning theorists and by the early writings of the British sociologist Basil Bernstein (1964). Hess and Shipman (1965) summarized the perspective that guided most of this research from the late 1960's when they stated that:

> Behavior which leads to social, educational, and economic poverty is socialized in early childhood...the structure of the social system and the structure of the family shape communication and language and that language shapes thought and cognitive styles of problem-solving. (p.870)

Motivated by personal concern about the detrimental effects of poverty and discrimination on children and by a desire to demonstrate a need for early educational interventions for disadvantaged children, researchers concentrated on comparing the observed interactions of middle-class mother/child dyads to the interactions of lower-class mother/child dyads.

The results of these studies indicated that middle-class mothers were less controlling and restrictive, offered more explanations and personal appeals to justify their demands for specific behaviors, interacted with their children more frequently. However, there were some indications that the relationship between class factors and mother's capacities to motivate and support their children's cognitive development was not a simple linear relationship. Hess et al. (1968), like Shipman (1971) reported that their samples of children from the lower SES groups generally obtained lower scores on the various measures used to assess their cognitive functioning, and that these differences increased over time (Hess et al., 1969). While Hess et al. (1968, 1969) acknowledged that the effect of children's behaviors could have been investigated, they indicated that their research was designed to focus in on what they considered to be the most important aspect of the problem, "the maternal effects upon the child" (Hess et al., 1968, p.96).

Hess et al. (1968, 1969) also pointed out that although there were significant between group differences for maternal teaching strategies and these continued to be related to the intellectual achievement and later school performances of the children, there were also considerable within group variations in terms of the various information-transmission strategies that mothers relied on and in their use of control strategies. In general:

> The data indicate that maternal teaching styles, reflecting the mother's information-processing strategies, techniques for controlling her child's behavior, and her attitudes toward education and the schools, are equal to or better than IQ and social class as predictors of the child's cognitive functioning. (Hess et al., 1968, p.192)

In general the results of comparisons between middle-class and lower-class mothers indicated that middle-class mothers interacted in a warmer manner, were more verbally expressive, generally used more words and specifically used more nouns, verbs, adjectives, and sentences involving more elaborate syntactic structures. In addition, their instructions to their children were more specific, they provided more substantive information, and they relied more on positive feedback techniques (Bee, Van Egeren, Streissguth, Nyman, & Leckie, 1969; Brophy, 1970; Hess, Shipman, Brophy & Bear, 1968; Kogan & Wimberger, 1969; Levenstein, 1970; Olim, 1970; Olmsted & Jester, 1972; Schlieper, 1975; Shipman, Barone, Beaton, Emmerich, & Ward, 1971; Zunich, 1962).

These results were generally interpreted to mean that lower-class mothers, probably as a result of the pressures and disadvantages of their lives, were not adequately stimulating their children's cognitive development by providing a sufficiently rich linguistic environment or by emphasizing more effective teaching strategies. Furthermore, it was concluded that the lower scores disadvantage children obtained on the various measure of cognitive functioning confirmed the suggestion that lower-class mothers had not effectively prepared their children for participating successfully in the public schools. (See Streissguth & Bee, 1972 for a complete review.)

Recently Laosa (1978) compared the maternal teaching strategies of Chicano mothers to those used by Anglo-American mothers (Laosa, 1980). Observing a task in which mothers were asked to "teach" their children to reproduce two different tinker-toy models, Laosa coded nine maternal teaching behaviors that constitute the Maternal Teaching Observation Technique (MTOT) that he had developed. He (1978) found that variations in the preferred maternal teaching strategies of Chicano mothers were related to the level of education they had attained, rather than to their SES classifications. These same variations in the preferred use of teaching strategies also differentiated Chicano mothers from Anglo-American mothers; however, when the mother's educational level was introduced as a covariant, the differences between the two cultural groups were no longer significant for any of the variables he measured (Laosa, 1980).

Laosa's results indicated that when mothers were more highly educated, they tended to rely (in order of frequency) on praise, visual cues, inquiry, directives, and modeling. Less educated mothers relied (in order of frequency) on both visual cues and modeling, directives, praise, and inquiry. Father's, and/or mother's occupation, the most common measures of SES, were not related to the use of maternal teaching strategies nor were they significantly related to the level of education of Chicano parents. Laosa pointed out that this has implications for interpreting the results of SES group comparison studies that use occupation as a major determinant of SES.

Brophy (1970), describing his part of the Hess et al. (1968, 1969) investigation, pointed out that SES group differences were greatest, more consistent, and more obvious during the "orientation period" (i.e., that portion of the block sorting task when mothers introduced the task to their children, prior to asking the child to perform the task), and in the type of directions that mothers gave to their children prior to each child response (i.e., "preresponse instructions"). He pointed out that his results suggested that the situation in which behaviors were observed influenced the behaviors that occurred, and that "SES differences will be maximal in situations which require the parents to be proactive and will be minimized in situations which allow them to be reactive" (p.91).

Kogan and Wimberger (1969) reported the results of a study during which they had compared ten lower SES mother/child dyads with ten upper middle-class mother/child dyads. They observed these dyads for 42 minutes, during each of two sessions. The major portion of these observations occurred during unstructured free-play; however, for the last 12 minutes of each observation mothers were told to make something with their children. Instead of focusing only on individual's behaviors. Kogan and Wimberger also analyzed the forms and structures of the interactive behaviors of the dyads. They indicated that the frequencies and types of behavioral patterns exhibited by the dyads they observed had not differed dramatically. What had differed were the qualitative aspects of these interaction. They indicated that:

> ...although culturally deprived mothers and children responded to each other with the same status and affection qualities with which culturally advantaged families interacted, they were more detached from each other and engaged in less active social interchange. the children's behavior was less likely to be similar to their mothers', and more likely to be based on status contingencies. In addition, they exhibited combinations of behavior not found in comparison Ss. such as simultaneous display of high status, extremes of negative affect in association with the other person's assuming strong control, more frequent occurrence of simultaneous neutrality with less intense interaction, and absence of positive affection or warmth in the presence of friendly control by the other participant. (p.352)

Thus the stage has been set, on the basis of a handful of studies, for initiating a massive federally sponsored program that was designed to improve the educational environment of children from families who were economically disadvantaged. The fact that none of these programs had demonstrated which maternal behaviors actually did facilitate children's higher performances on specific tasks or tests seemed to be of concern to only a few.

Sroufe (1970) argued cogently that research which has as its"... logical end point an intervention in individual lives demands that there be careful examination of implicit value judgements, as well as research methodology" (p.140). He offered possible alternative interpretations of the correlational results which had been obtained by Bee et al. (1969) in order to demonstrate that the frame of reference researchers were using was determining their conclusions. He pointed out that:

> Intervention into the life style of an entire subculture by the middle-class scientist would seem to be an audacious step, demanding full discussion: yet, probably because of the pathology model, these proposals have generated no more debate than surrounds a decision to alter the lighting in an experimental rat colony. (p.143).

Bee and her associates (1970) defended their initial research assignment but did

> ...suggest that a recasting of the entire general problem of compensatory education is needed. It is essential that we see the problem not as either 'all in the child,' or 'all in the school,' but as an interaction...solutions must come from more knowledge about the characteristics of the children and the processes of teaching which maximize learning for children of different backgrounds or different styles. (p.148-149).

A few other cautioning voices were also raised. Kagan (1970) and Hunt (1968/1970) stated that the data that had been reported was not substantial enough to support any of the theoretically based ideas for interventions that had been offered as means for altering the acknowledged school performance deficits that children from lower socio-economic classes generally evidenced. Bruner (1970) noted that there was beginning to be an awareness that merely providing enriched environments would not be a solution, and that the child's active participation in his environment needed to be emphasized. He went on to state that merely providing preschool intervention programs would not be sufficient. "If we are to be effective in helping disadvantaged children cope better, it is their life cycle that must be dealt with, not their preschool or their nursery or their street life" (p.115).

Schlieper (1975) replicated Zunich's (1962) laboratory observation study by observing lower-class mother/child dyads and middle-class mother/child dyads in their own homes. Like Zunich (1962), she found that lower SES mothers did more directing, restricting, and criticizing, and that they interfered more with their children's actions. In contrast to Zunich (1962), Bee et al. (1969), and Kogan and Wimberger (1969), Schlieper found that lower-class mothers were as attentive to their children and as likely to engage them as middle-class mothers were. She attributed the differences in her results to the more relaxed atmosphere of the home setting.

Only Kogan & Wimberger (1969) seriously considered the possibility that differences between the groups of children might have had a direct effect on the behaviors of their mothers. They concluded that it was generally not the individual behaviors, but rather the combination of behaviors and the "interactive contingencies between mother and child behaviors" (p.350) which differentiated the dyads from the different social classes they had observed. They stated that:

> ...although some of the kinds of interactive behaviors displayed by the lower and middle class pairs were different, differences in quality rather than kind might be even more important." (p.352)

<u>Middle-class fathers versus lower-class fathers.</u>

Norma Radin is one of the few researchers who has not neglected fathers. For the past decade she and her associates have been studying the relationship between fathers' nurturant behaviors towards their preschoolers and the cognitive development of those children. Initially Radin (1972) compared the interactive behaviors of middle-class fathers to those of lower-class fathers. These fathers were observed in their homes while they were participating in a 30 minute interview session at which their 4-year-old sons were present. Twenty categories of fathers' behaviors (e.g., fully meeting explicit needs of the child, meeting implicit needs of the child, asking information of the child, affection. positive response to child, cognitive stimulation, etc.) were clustered into two facets, one was labeled Nurturant Behaviors and the other was labeled Restrictive Behaviors. After the observation sessions children were tested using the Stanford Binet and the Peabody Picture Vocabulary Test. Radin's results indicated that middle-class children scored significantly higher on the two standardized tests. The number of observed father/son interaction, the frequency of nurturant behaviors in general, and specifically the behaviors categorized as "fully meeting explicit needs of the child", "meeting implicit needs of the child", and "asking information of the child" all occurred more frequently while the middle-class fathers and their sons were observed. Paternal nurturant behaviors were highly correlated with children's IQ scores on both tests and with the total number of interactions observed. Restrictive behaviors were not significantly correlated with children's IQ scores.

A follow-up study (Radin, 1973) demonstrated that the relationship between paternal nurturant behaviors and children's IQ scores continued to be significant a year later when the children were retested. Radin concluded that:

> ...regardless of the causal direction, it appears that a strong linkage exists over a relatively prolonged period between a father's use of reinforcement, consultation, and sensitivity to his son, and the boy's intellectual performance. (p.374)

In addition, Radin indicated that the amount of time fathers reported they spent being directly involved in academic type teaching activities with their sons was positively related to the children's intellectual performances. She suggested various possible explanations for this finding (e.g., modeling, the activities themselves, sex-role identification) and noted that "direct paternal instruction of both daughters and sons appears to warrant further investigation" (p.376).

Radin and her associates (Epstein & Radin, 1975 Jordan, Radin, & Epstein, 1975; Radin & Epstein, 1975) subsequently undertook a more comprehensive study involving a larger sample of father/child dyads (N =180). Prior to the study, on the basis of a pilot study (Radin & Epstein, 1975), it was demonstrated that informing fathers that they were being directly observed did not significantly alter their interactive behaviors, and therefore fathers in this larger study were informed of this procedure. This larger study also involved the use of additional questionnaires and behavioral categories as well as a series of Piagetian tasks, developed by Rheta DeVries (1971). For analysis purposes, the children were divided by sex and by high versus low IQ scores. Factors involved in parental nurturance with daughters versus sons were also determined. The children's motivation was assessed, using information from the face sheet of the Stanford Binet IQ Test, and was categorized as "person-oriented" or "task-oriented" (Epstein & Radin, 1975).

The results for this larger sample reconfirmed and clarified Radin's previous investigations. Although for sons, in general, nurturance was positively related to their IQ scores and to their Verbalization scores on the Piagetian tasks, this relationship only proved significant for middle-class boys. There were no significant differences in the nurturant behaviors of fathers vis-a-vis their high or low IQ sons; however, when interacting with their sons, the middle-class fathers did demonstrate significantly more nurturant behaviors than the lower-class fathers. Late paternal "independence-granting" was also significantly and positively related to intellectual functioning of middle-class boys. (Jordan, Radin, & Epstein, 1975).

In terms of motivation, observed nurturant behaviors by fathers of boys was positively related to both person-oriented and to task-oriented motivation, as well as to the Stanford Binet IQ scores. The motivation of middle-class and working-class boys, but not lower class boys, was enhanced by their fathers' nurturance. The resulting motivation was positively related to measures of their cognitive functioning. For lower-class boys significant results indicated that motivation was inhibited and their cognitive functioning was depressed by paternal restrictiveness (Epstein, & Radin, 1975).

For girls a different picture emerged. To begin with, the factors which were evident during father/son interactions were different from the factors which emerged for father/daughter interactions. Although the frequencies of observed paternal behaviors were similar, the behaviors which contributed to the fathers with daughters factors were more ambiguous than the behaviorial clusters obtained for father/son interactions. For boys the first two factors were clearly nurturant while the remaining two factors could reasonably be classified as restrictive or controlling. Six factors emerged for father/daughter interactions and the first three contained what Radin and Epstein (1975) referred to as "mixed messages" (p.9), that is, the factors included nurturant and supportive behaviors, as well as restrictive and punitive behaviors. They concluded that "...it appears that a fundamentally different factor structure underlies observed father behaviors with boys and girls" (p.10).

As opposed to boys', girls' cognitive functioning was significantly related to their fathers' occupational status. Middle-class girls scored higher on cognitive measures than lower-class girls did; however, their scores were not significantly related to the observed behaviors of their fathers. Like fathers of boys, fathers of girls nurturant behaviors were not associated with their child's ability group (high versus low IQs). In contrast to fathers of boys, fathers of girls nurturance was not associated with their social class. Also in contrast to middle-class boys, early paternal "independence-granting" was positively associated with the IQ scores of lower-class girls. When a measure of the age at which fathers' expected their daughters to achieve various competencies was included in the analyses, it was found that fathers' expectations for later achievement for their daughters was positively related to the daughters' Piagetian Verbalizations scores (Jordan, Radin, & Epstein, 1975).

Although fathers' behaviors were related to the person-oriented and task-oriented motivation of their daughters, just as they had been for boys, the impact of that motivation was not reflected in higher scores on measures of girls' intellectual functioning.

Based on their results, Epstein and Radin (1975) have suggested that mothers' behaviors may be the important variable influencing daughters' intellectual performances and that possibly fathers' influence is indirect and mediated through the mother. Jordan, Radin, and Epstein (Note 5) indicated that the affective and need meeting behaviors of fathers, which they had investigated, might not be crucial for daughters' cognitive development and that future investigations should explore the influence of different kinds of paternal behaviors during father/daughter interactions.

Mothers interacting with handicapped children.

Relatively few studies have observed mothers interacting with their handicapped youngsters. When such studies have been undertaken they mostly involve comparisons between normally developing children and mentally retarded children. Mothers interacting with their physically handicapped children have rarely been observed.

Shere and Kastenbaum (1966) observed 13 mother/child dyads. The children all had cerebral palsy, none could walk or talk. Their ages ranged from 2;6 to 4;8 and their mental ages ranged from 7 months to 2;6. The mothers of these children were interviewed at length and observed in order to ascertain how they were trying to help their handicapped children to interact with and learn from their environments. Six, two to three hour home visits, spanning a 7 to 8 month period were undertaken by two observers who spent the major part of that time observing the mother child interactions. Forty-five minutes of this observation time was devoted to observing the child during solitary play. Shere and Kastenbaum found that these mothers were generally not aware that their children were being deprived of cognitive stimulation because of their handicaps and that, although they provided adequate and appropriate physical care, these mothers generally did not present objects to their children nor did they encourage their children to use and explore those objects that were within their reach. These children when left alone, contrary to their mothers reports, did not usually engage in play activities of any sort. They indicated that the passivity of these handicapped children was generally interpreted by their mothers as indicating that their children were "good", comfortable physically, and satisfied not to be interacting with their mothers. Furthermore, almost all of these mothers encouraged dependent behaviors in their children.

Kogan, Wimberger, and Bobbitt (1969) observed six mothers interacting with their retarded 4 or 5 year-old youngsters for 36 minutes on two different occasions. They compared these interactions to those of ten mothers interacting with their nonretarded preschoolers. Kogan et al. were particularly interested in the reciprocity of the mother/child behaviors. They indicated that when the interactive status patterns of mothers and their retarded children were reciprocal they tended be engaging in extreme behaviors. For example, the retarded children were most likely actually to comply when their mothers exerted strong controls or made firm demands.

The mothers of the retarded youngsters were more likely to exert control over their children, to demonstrate their own expertise, and to be assertive with their children, a pattern of behaviors which Kogan et al. (1966) refer to as a "high status" pattern. These mothers also exhibited "more extreme degree of warmth and friendliness than the comparison mothers did" (p.1243). In terms of behaviors directly related to the process of teaching, the mothers of retarded children and the comparison mothers relied on different interactive behaviors. The most frequent behavior the mothers of the retarded youngsters exhibited was asking questions to which they themselves supplied the answers, or questions to which they already knew the answer. The second most frequent behavior by mothers of the retarded youngsters was giving orders. The mothers of nonretarded children gave only half as many orders and instead relied most on making statements that indicated their agreement with or acknowledgement of their children's activity. They also relied heavily on statements in which they presented their own thoughts and ideas.

As was to be expected, the two groups of children also differed. The most frequent behavior of the retarded preschoolers was the utterance of unintelligible vocalizations. The next most frequent behaviors were "expressive exclamations and brief factual answers to questions" (p.1249).

> When retarded children displayed low status behaviors they did so either via nonverbal compliance, by echoing words their mothers had said or by asking for information. (p.1249-1250)

In addition, the retarded children exhibited both less submissive, and less assertive behaviors than the nonretarded children. The affective behaviors of the two groups of children did not differ significantly, but, in comparison to the nonretarded children, the retarded children were more likely to display" ambiguous status" (i.e., behaviors which were not clearly submissive or assertive). They also tended to display more neutral status, and they "were slightly less actively engaged in interactions with their mothers..." (p.1245).

In contrast, the nonretarded preschoolers, that Kogan et al. (1969/1973) observed, most frequently "reported facts about what they were doing or expressed personal opinions about it" (p.1249). These comparison children rarely uttered unintelligible vocalizations and when they were displaying low status, they did so by asking questions, by asking for help or guidance, or by expressing their ideas in a tentative manner. Nonretarded children "assumed low status over twice as often as did the retardates" (p.1250), a finding which indicates that they behaved in a more cooperative and appropriate manner considering their role as child vis-a-vis their mother.

Kogan and Tyler (1973) observed 10 mothers interacting with their physically handicapped (cerebral palsied) youngsters (15-48 months-old). They compared these interactions to previous observed (Kogan, Wimberger, & Bobbitt, 1969) interactions of 15 mothers and their nonhandicapped preschoolers (2-5 years old), and six mothers and their mentally retarded 3 to 7 year-old children. They found that there were no significant behavioral differences between the mothers of the retarded children and the mothers of the children with cerebral palsy, and that both of these groups of mothers were more likely to display "high status control and authoritarian behaviors" (p.496). The mothers of retarded and cerebral palsied children both exhibited more warmth, a characteristic which Kogan and Tyler suggest was indicative of an over protective stance.

The children who were physically handicapped, like those that were retarded, were more frequently rated for low involvement. Kogan and Tyler found that this indice of passive participation was very significantly correlated with lower levels of language development, but not with lower levels of motor development. The only significant difference between the two groups of developmentally delayed preschoolers was on the number of "strongly assertive and controlling behaviors" that they displayed. The children with cerebral palsy exhibited significantly more of these behaviors that the retarded youngsters did.

Kagan and Tyler point out that the majority of the interactive behaviors that they observed were similar across the three groups of children and their mothers and that it may be more pertinent to consider differences in the degree of the observed behaviors, rather than looking for differences in types of behaviors than can be observed.

Wilton and Barbour (1978) compared two groups of lower SES mother/child dyads. Five of the preschoolers were considered high-risk because they had a family history associated with cultural-familial retardation. The other five preschoolers did not have a retarded parent or a retarded sibling. Furthermore, they did have a sibling who was functioning adequately in a regular classroom situation. Following the model used by the Harvard Preschool Project (White, Watts, Barnett, Kaban, Marmor, & Shapiro, 1973), Wilton and Barbour used the <u>Children's Activities Scale</u> and the <u>Interaction Technique Scale</u> to code observed interactions between mother/child dyads who were at home following their usual routines of the day. They found that in the 30-48 month old age group the "high-risk" children generally did not interact as much with their mothers, and particularly not in activities that were "highly intellectual" (e.g., jigsaw puzzles, looking at picture books and naming pictures, drawing with crayons). The mothers of the "high-risk" children spent significantly less time in "didactic teaching" activities (e.g., reading to their children, showing them how to use toys and materials). These mothers encouraged their children less frequently, discouraged them from engaging in activities more frequently, and when they attempted to control their children, they succeeded significantly less often than the mothers of the control group of preschoolers.

Marshall, Hegrenes, and Goldstein (1973) observed a total of 40 mentally retarded and normally developing preschoolers (3 to 5 year-olds) as they interacted with their mothers during a free-play situation. Using a Skinnerian classification system for verbal operants, they found that the mothers only differed in their use of "mands" (i.e., commands, demands, requests, and asking). Consistant with results from other studies, these mothers of the retarded used manding behavior more frequently than the mothers of the nonretarded children. The behavior of the two groups of children differed on all four of the verbal behavior measures. Normally developing children uttered more "tracts" (i.e., naming, labeling, or describing), more mands, and more "intraverbals" (i.e., "responses...described as being under the control of verbal stimuli, but [which] have no point-to-point correspondence with them." p.416). However, retarded children uttered more "echoic" responses (i.e., repetitions of their mothers verbalizations)

In order to investigate the relationship between the behavior of children and modifications in the speech of mothers interacting with their children, Cunningham, Feuler, Blackwell, and Deck (1981) used two samples that they matched for PPVT Mental Age scores (MA), sex, and SES. Using an antecedent-consequent sequence coding system, they compared the interactions between 18 mothers and their normally developing children to the interactions of 18 mothers and their retarded children during a 15 minute free-play situation and during a 15 minute structured puzzle constructions activity. They also divided each of the two samples groups in terms of the children's MA scores (above or below 28 months) so that they could compare the behaviors of dyads with higher functioning children to the dyads with lower functioning children.

Cunningham et al. (1981) found that, in comparison to the dyads with retarded children, the mothers of normal children initiated interactions more frequentl, and were less directive. They also rewarded their children more frequently when their children complied on the "task-oriented activity" (p.62). Mothers of children with higher MAs (normal or retarded) asked their children more questions and offerred more command-question directives to their children. The complexity of maternal speech was not significantly different between the two groups, but all mothers of children who had higher MAs used more words per utterance (MLU) and uttered more command-question directives to their children.

The normally developed children initiated more interactions than the retarded children did and they were more responsive to their mothers during the interactions. Retarded children with lower MAs were less responsive to their mothers questions than normal children, however, when the two groups of children with higher MAs were compared, their responsiveness did not differ significantly. Normal children also engaged in less solitary play. The mean length of utterances in words (MLU) for normal children was longer than for the retarded children and within the normal group children with higher MAs (above 28 months) had longer MLUs than children with lower MAs. Within the retarded group there was no significant difference in the MLUs of the higher versus the lower functioning children. Normally developing and retarded children did not differ in the ratio of their compliance to their mothers directives; however, children who had higher MAs were generally more compliant.

Having established behavioral interactive differences, Cunningham et al. (1981) also analyzed the relationship between the relative complexity of the mother's language in relation to her child's speech (determined by the ratio of mother's MLU to child's MLU and the ratio of mother's Developmental Sentence Score to child's PPVT score). They indicated that their results:

> ...suggest that the calibration of maternal speech to young children is closely related to the development of reciprocity in the mother's interactions with the child. (p.69)

Dolley (1974) used the maternal teaching styles model that had been developed by Hess et al. (1968) in order to investigate the cognitive and linguistic stimulation that mother provide to their younger (4 to 7 years old) and older (11 to 13 years old) trainable mentally retarded youngsters. She compared observed maternal behaviors during the mother/retarded child interactions to observed behaviors of the same mothers as they interacted with either one of their older or younger nonretarded children. Three different task were used all of which involved the mothers in teaching their children. In addition, Dolley taught each child a task which the child then taught to its mother. The coding system developed by Hess and Shipman (Hess et al., 1968) was used to code both verbal and nonverbal behaviors observed during the mother/child interactions. From this data, five sequential communication patterns were extracted using a computerized data processing system devised by Collett and Semmel (note 6). These resulting behavioral sequences were labeled as Orientation-Motivation patterns, Elaborated Explanation patterns, Restricted Explanation patterns, Elaborated Question-Response-Feedback patterns, and Restricted Question-Response-Feedback patterns. A sixth category for nonteaching strategy patterns was also included for the analyses.

Contrary to her hypotheses, Dolley found that the measured level of the child's social competence did not significantly influence the mothers' use of restricted or elaborated communication patterns. She suggested that, because the teaching tasks were not unduly difficult, the dyads consisting of mothers and competent children were able to understand the task without having to rely on complex verbal interactions. She noted that when mothers interacted with older and more capable nonretarded siblings the interactive behaviors tended to be nonverbal and cooperative. Dolley concluded that, although she had found some differences in the patterns used by mother/child dyads, the use of elaborated versus restricted patterns, measured in terms of the amount of time involved or the frequencies of transitions in patterns, was not a satisfactory method for differentiating the maternal teaching styles used by mother interacting with children of varying levels of competence. Before these patterns can be useful "the definition of elaborated and restricted communication codes must be made more precise, and parameters affecting the use of these patterns must be specified" (p.176).

__Second reciprocity__

Before closing this review, there is another issue which has not been directly suggested by the literature reviewed, but which is relevant and needs to be expressed in order to clarify the perspective from which this study emanates. As is clear from this review, in the past ten years the point of view from which research on the observed interactions between parents and children, and in some cases between teachers and children, (Good & Brophy, 1969), is designed and interpreted has shifted dramatically. Where originally efforts had been directed at studying the characteristics of mothers, or teachers, or children, the emphasis today is on investigating the reciprocity of behaviors by all the participants that are interacting. While this is a major step forward in terms of understanding such interactions, a side effect of this vantage point is the assumption that reciprocity, (i.e., the balancing of needs, the give and take of interactions) in and of itself, is evidence of "good parenting", while a lack of reciprocity is indicative of "poor parenting".

The study being undertaken is specifically interested in the cognitive development of children and how that development is fostered. One of the basic tenets of cognitive development is that the children's motivation for learning, if it has not been stifled, comes out of an awareness that there is some discrepancy, dissonance, or unfulfilled potential in their interactions with the concrete objects (including people) in their environments (Piaget, 1952, 1970; Sigel & Cocking, 1977). Klaus Riegel (1979) has made an eloquent appeal for the recognition that such dialectical interactions (i.e., conflictual, antithetical interactions) are a pervasive aspect of all the relationships that influence cognitive development.

> Dialectical conceptualization characterizes the origin of thought in the individual and in society. More important, dialectical conceptualization represents a necessary synthesis in the development of thought toward maturity. (p.36)

Riegel also points out, quite correctly, that Piaget's propensity for describing the processes by which children further their knowledge, has resulted in an emphasis on how stages of development are accomplished and on describing what the nature of the reciprocity between the child's stage of development (i.e., their competence) and their performance vis-a-vis objects is like. At the same time what has been deemphasized, but underlies Piaget's theory, are the reasons why children are motivated to move from one stage to the next; why they accomodate to the objects or people they encounter and why they assimilate the experiences they have had. From the dialectical psychologists' perspective, it is as a result of the dialectical nature of interactions that developmental change is primarily motivated (Riegel, 1979; Sigel & Cocking, 1977).

Unfortunately the language used to describe the affective and/or cognitive states that dialectical interactions precipitate tends to have negative connotations. Terms such as anxiety, disharmony, conflict, cognitive dissonance, etc. conjure up an image of the "bad" or the "mean" parent or teacher, even though it is acknowledged that some of the greatest teachers of all times (e.g., Socrates, Dewey, Freire) made their pupils very uncomfortable by engaging them in dialectical interactions which forced them to reevaluate what they thought they knew.

The importance of reciprocity in interactions between parents, and/or teachers, and the children they are interacting with should not be depreciated or underestimated. Nevertheless, the importance of dialectical interactions for effective teaching and socialization must be accounted for and more positively regarded when systematic observations of interactions are planned and interpreted.

Summary and Conclusions

All of the studies that have been reviewed offer support that differences between groups of mothers as teachers and/or socializers of their children do exist. In general, when they are engaged in teaching activities, mothers who have had less education or economic advantages and/or who have children that do not perform within the normal range, on measures of language and cognitive functioning, tend to restrict, control, demonstrate, and generally interfere with their children's actions. Although it is not stressed, the data from these same studies indicates that children who are handicapped by developmental delays, by economic and educational disadvantages, and by family instabilities, perform less adequately on prescribed tasks and on standardized measures of intellectual functioning. Furthermore, these children appear to be less cooperative and seem less motivated to succeed than children whose lives are more privileged; in other words, mothers who favor different teaching strategies seem to have children who are different, and, values aside, causal links and the direction of such links have not been clearly demonstrated by any of the studies reviewed.

Research on teaching/learning interaction between parents and their preschool children have been hindered by some conceptual and methodological shortcomings. Until recently, researcher assumed that mothers were the primary determinants of their children's educability. Influenced by a general trend to recognize the reciprocal aspects of interactions, attention has increasingly been focused on the role of the child's behavior as a contributing factor influencing the parent's behavior. However, the influence of context on interactions has rarely been adequately recognized. (Cazden, 1970, Garnica & King 1979).

Frequently, when parent/child teaching/learning interactions have been observed, the behaviors which have been considered were either not directly relevant to the questions being asked or they did not appear to be crucial for effectively teaching the prescribed tasks. If parents' teaching skills are to be judged and their effectiveness as facilitators and stimulators of their children's cognitive development is to be measured, then it is not fair or sensible to concentrate mainly on observing parental techniques for controlling, disciplining, and rewarding children. By the same token, it is not fair or sensible to measure parents' success as teachers of their children solely in terms of their children's performances on standardized test which do not directly measure what observed parents were deliberately trying to teach their children. Children's observed cooperation or their performance on prescribed tasks also are not sufficient measures for determining whether a task was being effectively taught.

If we accept the premise that parent involvement in their children's preschool education is an essential component for insuring children's optimal growth and development, especially in the cognitive domain, then we must also acknowledge the burden this places on parents, particularly if their children are difficult to teach. Programs which require mothers either to implement or supplement educational curricula through home teaching and neglect to include fathers overlook a vast untapped resource whose potential contributions could extend beyond the individual child to all the family members. As Reichler and Schopler (1976) have pointed out, the literature by parents of children with special needs speaks eloquently of the capacity for parents to work as a team and to share the responsibilities cooperatively, the joys, and even the agonies of raising and teaching their own children (Greenfield, 1972; Park, 1967; Wilson, 1968). All parents, and for that matter other family members, who can discuss what did or did not work, what to try next, where to go from here, and who should teach what, can help one another over the disappointments of their unsuccessful teaching efforts and can congratulate each other on their successful efforts.

This review of the literature has indicated that there is a need for studies and for observation systems which are directly relevant to the question of how parents teach their preschool children when they are making an effort to function in a teaching role. Observational studies are needed which focus on the actual substantive content being taught and the kinds of verbal-logical behaviors used to accomplish the goals of the teaching/learning activity. The behaviors of both mothers and fathers, and of their children need to be observed and accurately described. Once these behaviors are known, the possibility for reasonably evaluating variations in behavioral patterns can be entertained.

Initial efforts should concentrate on clarifying the categories of behaviors from which cognitive processing can reasonably be inferred and to develop or select observation systems which could be use not only for formative and summative evaluations of preschool programs, but also for longitudinal investigations that focus on the relationship between parental teaching efforts and children's cognitive development (Gray & Wanderman, 1980). This is the mandate that motivated this stuoy and determined the hypotheses which this study addressed.

The research being reported in the chapters which follow is based on observations that were made of normally developing and developmentally delayed preschoolers as they interacted with their mothers, and on separate occasions with their fathers, during two different types of educationally oriented activities.

The main questions asked were:

1) What are the verbal-logical behaviors that occur when mothers and fathers engage in educationally oriented semi-structured and structured activities with their normally developing or developmentally delayed preschool children?

2) What content areas and specific topics are referred

to by parents and preschool children when they are being observed as they engage in specific educationally oriented activities?

3) Are the observed behaviors influenced by the amount of structure imposed on the activity being engaged in?

4) Are the observed behaviors influenced by the sex and/or developmental level of the children?

The specific objectives of this study were:

1) To utilize an established observation system, originally developed for observing classroom interactions on the elementary and secondary school level, with normally developing preschoolers, developmentally delayed preschoolers, and their parents.

2) To describe the topics of conversation and the verbal-logical behaviors that occur while parents and their own preschoolers are engaged in two situations: (a) a semi-structured educational activity and (b) a structured educational activity.

3) To investigate the influence of the structure of these educational activities and the sex and developmental status of the children, on the topics discussed and on the verbal-logical behaviors utilized by parents and their preschool children.

4) To investigate the relationship of children's performance scores on a task involving classification

of objects by their attributes, to the topics referred to and the types of verbal-logical behaviors that were observed during the parent/child interactions.

5) To compare the observed behaviors of fathers and mothers when they taught their own preschoolers.

6) To compare the observed behaviors of children when they were being taught by their fathers, to the observed behaviors of children when they were being taught by their mothers.

7) To compare the observed behaviors of developmentally delayed boys, to the observed behaviors of normally developing boys and normally developing girls.

Definition of Terms

Prior to presenting the hypotheses which were addressed by this study, certain terms used throughout this report must be defined. These terms are presented below. Operational definitions and examples for all of the categories in the observation system that was used are provided in Appendix B. Coding instructions are provided in Appendix C.

Discourse variables include all the categories of the observation system that were used to code both the content that was referred to and the verbal-logical behaviors that were expressed by parents and their children as they interacted during two educationally oriented activities. The content categories provided a means for coding all the possible substantive and/or instructional topics of conversation. The verbal-logical behavior categories were used to code the linguistic forms and communicative functions expressed by the dyads. Summaries of all these categories and some examples from the data that was collected are provided in Tables 1, 2, and 3.

A facet of an observation system is defined as "a set of categories... if they form a clear, mutually exclusive set, and all examples of the events in which we are interested can be coded in one of them." (Dunkin & Biddle, 1974, p.). The observation system used for this study consists of seven facets which are used to code utterances and/or gestures that are referred to as "pedagogical moves". The facets were designed to determine: (1) the emitter of the pedagogical move, (2) the linguistic form of each pedagogical move, (3) the substantive content being referred to, (4) the communicative function associated with that substantive content (5) the instructional content being referred to, (6) the communicative function associated with that instructional content, and (7) the number of words required to complete the pedagogical move.

Pedagogical moves are the units used in coding the expressed behaviors that are observed during parent/child educationally oriented activities. A pedagogical move consists of a single utterance, or a series of utterances, by one speaker which focus on the same topic of conversation while maintaining a specific linguistic form and a specific communicative function. The boundaries of pedagogical moves are not determined by pauses or inflections, but rather by shifts in either the focus of the topic or shifts in the linguistic form. In the following two examples of dialogues that occurred during the observed parent/child interactions, pedagogical move boundaries are indicated by slashes.

Example 1

M: What do you want?/

C: I want to build a building./

M: You want to make a building?/ What kind of a building?/

C: An Empire State building./

M: Why don't we make a lot of different buildings and each make one a litle bigger than the next one./ You want to do that?/

C: Let's make (pause) make the Empire State Building./

Example 2

F: And what, what are these then? What do we call these?/

C: Round./

F: Round and what else?/

C: Oh, they were there./

F: No, these are short and round./

C: Yeah./

F: And these are tall and round. And these are tall and square. And these are short and square./ Now if I give you some more, do you think you can put 'em in the right squares?/ Okay, let me get 'em out and see if you can tell which of the four groups they go in,/ okay?/

C: Yeah./

Verbal-logical behaviors are specified in terms of the linguistic forms and the communicative functions of the pedagogical moves expressed by parents and children. The categories for coding the "linguistic forms" of these moves are adapted from the pedagogical moves facet of the Columbia Instrument (Bellack et al., 1966), and include such categories as structuring, soliciting, responding, and reacting, etc. The categories for coding the "communicative functions" of these moves are adapted from the substantive-logical meanings facet and from the instructional-logical meanings facet of the Columbia Instrument, and include such categories as defining, fact-stating, explaining, rating, soliciting a performance, etc. (A summary of the verbal-logical behavior categories and some examples from the parent/child interactions are provided in table 1 and table 3.)

Linguistic Forms of pedagogical moves are specified by categories adapted from the pedagogical move types facet of the Columbia Instrument (Bellack et al., 1966). These categories are used to code certain syntatical aspects of the language behavior that was observed (e.g., soliciting, responding) and to indicate the form in which the language behavior was communicated (e.g., verbal, nonverbal). A summary of the categories used to code the linguistic form of the moves is provided below in Table 1.

Table 1

Categories For Coding The Linguistic Forms of Pedagogical Moves

Linguistic Form Categories	Examples
Structuring	C: <u>I think we oughta play with the other game</u>.
	M: <u>It's time for--We hafta do a different game now</u>.
Soliciting	F: <u>You tell me what the letters were</u>.
	M: <u>Want to make a different one this time</u>?
	C: <u>What is this</u>?
Tag Questions	C: Now that looks pretty, <u>doesn't it</u>?
	F: Just a little different, <u>isn't it</u>?
	M: This is the best way to do it. Let me show you. You take, you start out with a lot at the bottom, <u>okay</u>?
Responding	M: Find one that's

	Yellow.
	C: <u>This one's yellow</u>.
	M: And why is the knot there?
	C: <u>To hold this on</u>.
Reacting	F: You put your shoes on the wrong feet.
	C: <u>They feel good</u>.
	C: Broken.
	M: <u>No, it's not broken</u>.
	C: (Child stacking blocks)
	M: <u>Careful!</u>

Note. Moves provided as examples for coding categories are underlined. Additional moves are provided to clarify coding judgements. Category codes for the linguistic forms of moves are subscripted to indicate when they were nonverbal (NV) or noncomprehensible (NCP). If the linguistic form is unclear, it is coded NCL.

<u>Content categories</u> are used to code the topics of conversations that take place when parents are teaching their children. The content being referred to may be "substantive" (i.e., it refers to topics which were derived from the areas of knowledge that Piaget indicated are relevant for preschoolers (Piaget, 1952/1963, 1955/1970); or the content being referred to may be "instructional" (i.e., it refers to the management and media required for the instructional process). The content categories used for coding the substantive topics that the parents and children discussed were specifically developed for this study. The content categories for coding the instructional topics were adapted from the <u>Columbia Instrument</u> (Bellack et al., 1966). A summary of the substantive and instructional content

categories with some examples from the actual observations is provided below in Table 2.

Table 2

Categories For Coding Content Referred To During Parent/Child Interactions

Substantive Content Categories	Examples
Interpersonal Relationships	C: Please help Mommy.
	M: How about if we do it together? That sounds like more fun. We don't get a chance all the time to play together without Susie around.
Achievement and/or Mastery	M: You're so smart. I didn't know you knew all of them.
	C: Daddy, this looks hard for me to do.
	C: I never done that.
Object Attributes	C: Red. That's my favorite color.
	M: They're all the same height.
	F: There's four different kinds of shapes. Some are round. Some are square.
Action-Object Relationships	M: Whoops, that plopped.
	F: Yeah. Just turn it until it fits, doll.
State-Object Relationships	C: Here that's yours and this is mine.

	F: It's to big for the box. Isn' it?
	C: Where does this go?
	M: Oh. it's broken.
Representation	M: Now this is going to be the elephant head.
	F: You know what I thought it looked like?
	C: That one's a "X".
Classification	C: Ya don't match the color.
	F: Now find another block that's the same height and has the same letter on it.
Numerical Relationships	F: How many are there? C: Uhn. One. two. three. four. five.
	C: I got more block than you.

Instructional Content Categories	Examples
Truth and/or propriety of Statements	C: I know. but Daddy you'll jump me. F: That's right.
Repeated Statement	C: Diagonally. F: Diagonally. that's right.
	M: Here's blocks C: Blocks.
Expanded Statement	C: Here it is. A puzzle. F: A jigsaw puzzle.
Altered Statement	C: Not a little house. F: It's a big house.
Action and/or Procedure	M: You listen. you

	listen and you do.
	F: You know there's a faster way of doing this.
	M: Did you play with these toys last time, with Daddy? Did ya?
Materials	C: Why do they have clay?
	M: Oh look, here's a puzzle.
Person	C: You're silly you.
	C: Does Ruth Kahn live here?

Note. Moves provided as examples of coding categories are underlined. Additional moves are provided to clarify coding judgements.

Communicative Functions of verbal-logical behaviors are specified by categories derived from the substantive-logical meanings and instructional-logical meanings facets of the Columbia Instrument (Bellack et al., 1966). They include such functions as defining, describing, explaining, and rating any topic being discussed. The communicative functions of moves occur in association with specific topics of conversation. They are coded as either being related to substantive content, in which case they have "substantive-logical meaning", or to instructional content, in which case they have "instructional-logical meaning". A summary of these categories with examples from the observed interactions is provided below in Table 3.

Table 3

Communicative Functions of Pedagogical Moves

Logical Meanings Categories	Examples
Defining	F: What's the letter on top of it? M: "M".
	M: Yeah, gums. That's what holds the teeth in.
Fact-stating	C: The table's a little tipsy, isn't it?
	M: Do you remember that?
	F: Yeah, but it's not the same height.
Nonverbally Demonstrating	M: Find an "X". Where is the "X"? C: (locates block with "X" on it) M: That's right.
	F: Let me show ya two more and and then you can see how easy it's gonna be.
Verbally Demonstrating	M: And I'm gonna put the big tall cylinders together. And now I'm gonna take the little, tiny cylinders and I'm gonna put them together.
Explaining	F: No, that can't go together because they're different shapes.
	C: You never know what it is if you don't

		look.
Opining and/or Justifying	C:	Here's a...
	M:	Very complicated game.
	C:	He's terrible.
Rating Positively	M:	Oh, that's beautiful. (referring to picture child made)
	F:	You're right.
Rating Negatively	F:	You are impossible
	C:	That one zero.
	M:	No, that's an "X".
Soliciting a Positive or Negative Rating	C:	Like this?
	F:	Yeah, okay.
	M:	That matches that one?
	C:	Yeah.

Extra-Logical Meanings Categories		Examples
Giving Orders	F:	Come on up here.
	M:	Count one line, then count the next line.
	C:	Stop that!
Asking to be Directed	M:	What kind of game should we play?
Soliciting a Repetition	C:	What do you want to do?
	F:	Hm?
	C:	Duah bey bey.
	F:	What?
Seeking Permission	C:	But Mom, can we play another game after?
Complying	C:	Daddy help.
	F:	Okay.
	M:	Now find a red square.

	C: (based on M's reaction it is assummed that the child complied)
	M: Very good, okay!
Providing an Alternative	M: Would you like to read me a story?
	C: You read it.
Not Complying	M: Put it over there.
	C: No.
Joking	F: Hey, you're getting to be a pro.
	C: (laughs)
Word Play	M: Oh the dragon's roaring.
	C: Roooaaar!

Note. The moves provided as examples for each category are underlined. Some additional moves are included to clarify the verbal context in which coding judgements were made. Solicitations are coded in terms of the function they are intended to elicit, rather than in terms of the function they express.

The first six categories of logical meanings are used to code communicative functions associated with either substantive or instructional content. The last three categories are only coded in conjunction with instructional content.

Extra-logical meaning categorie are coded only in association with instructional content.

Educational Transactions are monologues or dialogues which focus on a particular topic. These transactions can be as short as one move by one speaker or they can last for as many moves as the dialogue continues to revolve around a specific content area. Types of educational transactions are identified by their content orientation (i.e., the substantive or instructional nature of the topic being discussed) and by their duration (i.e., the number of moves they contain). A complete description of how educational transactions were determined and the types of educational transactions that were analyzed is provided in the section on Educational Transactions in the Methods and Procedures chapter. Table 4 below indicates the categories used to identify educational transactions and provides some examples.

Table 4

Major Types of Educational Transactions With Examples From Parent/Child Interactions

Type of Content Orientation	Examples
Substantively Oriented (The topic of conversation is substantive content)	C: What is a pair? F: Hm? C: What is a pair? F: A pair is two thing that go together.
Instructionally Oriented (The topic of conversation is instructional content.)	C: Then we can play checkers after this. F: Alright. C: Ah, good.
Combined Orientation (The topic of conversation is conveyed by moves that combine substantive content with instructional content.) content.)	C: Where? M: Right on top of the triangle. Right on top of here. See here. It's right on top of that yellow triangle right here. C: Ummm M: That's it. Now we

		need another one next to it. Right on top of these blue ones.
	C:	Okay here.
Not Predominantly Oriented (The predominant topic of conversation is not substantive content, instructional content or combined content.)	M:	Stand 'em up and show me what are the same and what aren't
	C:	Um. See, these are two "Xs", see?
	M:	Okay.
	C:	Okay? (child placed another block)
	M:	That's the same.
	C:	Yeah.
	M:	Very good. Okay.

Type of Duration		Examples
Inputs (One or more moves by one speaker)	M:	Here ya go. (gives toy to C.)
	F:	Now we're gotta put yellow ones in, yellow triangles in to fit those white triangles.
Brief Transactions (Two speakers and two to three moves)	M:	What's that gonna be?
	C:	The part for the dog.
	C:	But Dad, but I don't have any help.
	F:	You want some help?
	C:	Yeah.
Moderate Transactions (Two speakers and four to seven moves)	M:	What color? What color?
	C:	Reh.

Extended Transactions
(Two speakers and eight or more moves.)

M: Red?

C: Mahmee, reh!

F: I'll tell you what. I got a good idea.

C: Hey, I got a good idea.

F: Alright, I'll put one and you put one.

C: I got a good idea. We both do it, huh?

F: Sounds great to me.

C: (refers to picture of a turtle) He looks mad.

M: Maybe he doesn't want to get out of the water. He likes his home and Huey took him out of his home. He wants to go back.

C: Why did he?

M: Why did he what? take him ou.

C: Yeah.

M: Just to play with him. He's probably gonna send him back kinda like you did last last summer with the crabs you found. You let 'em go back home.

C: Why did I?

M: Cause you wanted him to go back to his Mommy.

==

Demographic variables refer to the general demographic characteristics and individual attributes of the sample of individuals that were observed. Demographic data was collected for the variables of children's and parents' age and sex, the income level of the families, the present occupation of both parents, the previous occupation of the mother, and the educational levels attained by both parents. The amount of preschool experience that the children had was ascertained in terms of the number of months, the number of days per week, and the number of hours per day that the child had attended preschool. Parents were also interviewed using a semi-structured self-report instrument, developed by Norma Radin and Hanna Sonquist (1968), called the *Cognitive Home Environment Scale* (CHES). The CHES provided additional information about the various sources of cognitive stimulation available to the child in the home. Although the results of the CHES for mothers and fathers will not be reported on extensively in this study, the total score obtained by each parent was used to provide a means of comparing groups of parents.

Family group is a term utilized to indicate that the sample of families involved in this study are being described and compared in terms of the sex and developmental status of the preschooler they were observed interacting with. The three family groups established for this study were: (1) families with normally developing boys (NDB), (2) families with normally developing girls (NDG), and (3) families with developmentally delayed boys (DDB).

Developmental status is a term used to indicate that the children observed were functioning on different developmental levels, in terms of their present capacities to function in preschool programs. Sixteen of the families who were observed had either normally developing boys (NDB) or normally developing girls (NDG), all of whom were participating in regular preschool programs. Seven of the families who were observed had developmentally delayed boys (DDB) who had special needs and, therefore, were presently involved in preschool programs that provided special supportive services.

Test variables are scores obtained by children on the various testing procedures that are used for this study. Each child was given the Peabody Picture Vocabulary Test (PPVT) and received a mental age score (MA) which was one of the test variables for this study. In addition, mothers of all children were interviewed about their children's developmental status using the Preschool Attainment Record (PAR). The attainment age score (AA) calculated from the reported behavioral accomplishments of each child was another test variable. After the parents had taught the block sorting task to their children, the experimenter gave the children two test blocks to place and asked them to justify those placements. The points obtained by each child for their correct placement, and for their correct verbal justifications, were summed to determine the block sorting task (BST) score for each parent/child dyad.

Educationally oriented activities are activities undertaken in order to promote teaching and/or learning experiences. For this study two educationally oriented activities were engaged in: (1) a semi-structured free-play activity (SSFP), and (2) a structured block sorting task (SBST).

Task variables refer to certain aspects of the two different activities, that parents and their children participated in, which are either considered as possible sources of systematic error, or which are considered as useful measures of variance between family groups.

The task variables for the semi-structured free-play situation (SSFP) are: (1) the total number of toys used during each parent/child interaction, (2) the number of more complex toys used, ("hard toys") and (3) the number of less complex toys used ("easy toys"). (A complete description of "easy" versus "hard" toys can be found in the chapter three, Methods and Procedures).

The task variables for the structured block sorting task (SBST) were: (1) the task taught (A or B), (2) the order in which the tasks were presented to the child (e.g., task A first, task B second, or vice versa), (3) the order in which parents were observed interacting with their children (e.g., mother first session, father second session, or vice versa), and (4) the family group that the observed dyad belonged to (e.g., families with NDB, etc.). (For a complete description of the block sorting task see the Methods and Procedures chapter.)

Hypotheses

As is clear from the review of the literature there are few studies which have focused on developing or perfecting systems for observing parent/preschooler interactions. Research studies describing and/or comparing teaching/learning interactions between mother/child and father/child dyads are also scarce. The following hypotheses reflect these needs. All the hypotheses under investigation have been stated in the null form.

Parent Differences

When parents are teaching their own preschool-aged children:

Hypothesis 1 There will be no significant differences between the proportions for each of the discourse variables coded for parents, in each of the three family groups.

Hypothesis 2 There will be no significant differences between the proportions for each of the discourse variables coded for mothers, and the proportions coded for fathers.

Hypothesis 3 There will be no significant differences between the proportions for each of the discourse variables coded for parents during each of the two activities: (1) a semi-structured free-play activity, and (2) a structured block sorting task activity.

Hypothesis 4 There will be no significant differences between the proportions of types of educational transaction that parents in each of the three family groups participated in.

Hypothesis 5 There will be no significant differences between the proportions of types of educational transactions that mothers or fathers participated in when they were teaching their preschool children.

Hypothesis 6 There will be no significant differences between the proportions of types of educational transactions that parents participated in during the two educationally oriented activities.

Hypothesis 7 There will be no significant differences in interactive effects between family group, parent's sex/role, and the activity being engaged in, on the proportions for each of the discourse variables coded for parents or on the proportions of types of educational transactions parents participate in.

Child Differences

When preschool children are being taught by their parents:

Hypothesis 8 There will be no significant differences between the proportions of discourse variables coded for the children in the three different family groups.

Hypothesis 9 There will be no significant differences between the proportions for each of the discourse variables coded for children interacting with their mothers, and with their fathers.

Hypothesis 10 There will be no significant differences in the proportions of discourse variables coded for children during each of the two activities: (1) a semi-structured free-play activity, and (2) a structured block sorting task activity.

Hypothesis 11 There will be no significant differences between the proportions of types of educational transactions that children in the three different family groups participate.

Hypothesis 12 There will be no significant differences in the proportions of types of educational transactions that children participate in when they are interacting with their mothers or their fathers.

Hypothesis 13 There will be no significant differences between the proportions of types of educational transactions that children participate in during the two activities.

Hypothesis 14 There will be no significant differences in the interactive effects between family group, parent's sex/role, and the activity being engaged in, on the proportions for each of the discourse variables coded for children or on the proportions of types of educational transactions children participate in.

Process-Product Relationships For Parents

When mothers are teaching the block sorting task to their children:

Hypothesis 15 There will be no significant relationship between the block sorting task score obtained by children in each of the three family groups, and the proportions of discourse variables coded for their mothers during the two educationally oriented activities.

Hypothesis 16 There will be no significant relationship between the block sorting task scores obtained by children in each of the three family groups, and the proportions of types of educational transactions that their mothers participated in.

When fathers teach the block sorting task to their children:

Hypothesis 17 There will be no significant relationship between the block sorting task score obtained by children in each of the three family groups, and the proportions of discourse variables coded for their fathers during the two educationally oriented activities.

Hypothesis 18 There will be no significant relationship between the block sorting task scores obtained by children in each of the three family groups, and the proportions of types of educational transactions that their fathers participated in.

Process-Product Relationships For Children

When children are being taught the block sorting task by their mothers:

Hypothesis 19 There will be no significant relationship between the block sorting task score obtained by children in each of the three family groups. and the proportions of discourse variables coded for those children during the two educationally oriented activities.

Hypothesis 20 There will be no significant relationship between the block sorting task score obtained by children in each of the three family groups. and the proportions of types of educational transactions that the children participated in during the two educationally oriented activities.

When children are being taught the block sorting task by their fathers:

Hypothesis 21 There will be no significant relationship between the block sorting task score obtained by children in each of the three family groups. and the proportions of discourse variables coded for those children during the two educationally oriented activities.

Hypothesis 22 There will be no significant relationship between the block sorting task score obtained by children in each of the three family groups. and the proportions of types of educational transactions that those children participated in during the two educationally oriented activities.

Chapter III

METHODS AND PROCEDURES

Subjects

Children.

Subjects for this study consisted of twenty-three middle-class preschoolers and their parents. Sixteen of the families had normally developing children (NDC), eight of which were boys (NDB) and eight of which were girls (NDG). The remaining seven families had developmentally delayed boys (DDB).

All of the children ranged in age from 3.0 to 5.0 years, came from intact families, and had both fathers and mothers who were willing to participate in the study. In order to qualify as subjects, children had to be participating in a regular preschool school program or be involved in a special education preschool program.

Children were considered to be developing normally if they were participating in a regular preschool program, obtained an intelligence quotient score of 100 or above on the *Peabody Picture Vocabulary Test* and if their communication score on the *Preschool Attainment Record* was 10 or above.

Children were considered developmentally delayed if they were participating in preschool programs designed to meet their special needs, obtained an intelligence quotient score below 95 on the *Peabody Picture Vocabulary Test*, and scored below 10 on the communications section of the *Preschool Attainment Record*. Scores for communications skills were selected because language development is generally regarded both as an index of cognitive development and as one of the crucial determinants of that development (Schlesinger, 1974/1962; Edwards, 1973; Morehead & Ingram, 1973; Vygotsky, 1934/1962). Furthermore, a child's level of language development influences the verbal behaviors that adults use when interacting with that child (Berko-Gleason, 1979; Dolley, 1974; Kogan & Tyler, 1973; Snow, 1977). Table 5 indicates the chronological ages and the test scores for the children who participated in this study.

As is clear from the data provided in Table 5, the 23 children who participated in this study met the grouping criteria used for determining suitability for this study.

Table 5

Chronological Ages and Test Scores for Three Groups of Preschoolers

	Normally Developing Girls			Boys			Delayed Boys		
#	CA	IQ	COMM	CA	IQ	COMM	CA	IQ	COMM
1	44	148	12.0	49	110	10.0	48	93	8.0
2	48	115	11.0	44	130	11.0	52	76	7.5
3	42	114	10.0	53	122	13.0	52	39	8.5
4	49	120	12.0	48	126	10.0	43	59	7.0
5	52	106	11.5	52	135	11.0	60	31	7.0
6	42	145	12.0	52	115	12.5	47	54	4.5
7	43	114	10.0	57	144	12.0	56	73	9.0
8	53	130	10.5	60	122	10.0			
M	47	124	11.0	52	126	11.0	51	61	7.0

Note. CA= chronological age in months. IQ= *Peabody Picture Vocabulary* IQ score. COMM= communication score on *Preschool Attainment Record*. *M* = mean.

Parents.

The sample of parents who participated in this study were middle-class, Caucasian, fairly affluent, and well educated. As a group, the parents of the developmentally delayed boys tended to be somewhat younger, slightly less educated, and less affluent than the parents of the normally developing children. The differences between the parent groups were minimal and generally did not relate to variations in children's test scores or to the proportions of discourse variables coded for their interactions.

The mean age for the mothers with normally developing children (NDC) was 31 years and 5 months with a standard deviation of 2 years and 1 month. The mean age for the fathers of NDC was 33 years and 10 months (_SD_ 2 years. 3 months). The mean ages of parents with developmentally delayed boys (DDB) was slightly lower. The mean age for these mothers' was 29 years and 7 months (_SD_ 2 years. 3 months) and the mean age for these fathers' was 32 years and 2 months (_SD_ 3 years. 7 months).

Significant correlations were obtained between mothers' chronological age (CA) and the block sort test (BST) scores achieved when mothers taught their normally developing boys ($n = 8$; $r = .65$. $p < .04$). as well as for the mental age scores obtained by those normally developing boys. on the _Peabody Picture Vocabulary Test_ ($r = .80$. $p < .009$). It appears that for the normally developing boys in this study. having an older mother was advantageous. Why this was so. and if it would hold true for other samples. cannot be determined from the data that are available for this study. In any case the correlations between mothers' CA and children's BST scores or MA scores were not significant for normally developing girls or for developmentally delayed boys.

With the exception of one family. all the parents who participated in this study had not been married before and were the natural parents of the children that were observed. One father was a stepfather who had been a member of the family for the past three years. Almost all of the parents owned their own homes. The fathers tended to have professional or managerial level occupations; a few had had technical training and were skilled laborers; one father was a farmer. All of the parents had graduated high school; most had attended college, and the majority had graduated from college. Several parents had begun graduate studies or had already achieved advanced degrees. Most of the mothers were fulltime homemakers at the time of this study, although many of them had had jobs previously. Table 6 below, indicates the educational and occupational levels of the parents who participated in this study.

Table 6

Educational and Occupational Levels for Three Groups of Families

	FAMILIES WITH					
	NDG		NDB		DDB	
	M	F	M	F	M	F
Highest Level of Education Attained						
High Sch. grad.	0	1	0	0	4	2
Technical Sch. grad.	1	0	2	0	0	1
Attended College	2	1	1	0	1	0
College grad.	4	4	2	1	1	2

Graduate Studies	1	0	2	1	1	1
Masters Degree	0	0	1	1	0	1
Doctorate or equivalent	0	2	0	5	0	0
Present Occupational Level						
Homemaker	5	0	6	0	6	0
Semi-skilled	1	0	0	0	0	0
Technician or Skilled worker	0	2	0	0	0	3
Managerial or equivalent	1	3	1	1	1	0
Professional (no Doctorate)	1	1	1	2	0	3
Professional (Doctorate or equivalent)	0	2	0	5	0	1
Mother's Previous Occupation						
None	2	NA	1	NA	3	NA
Skilled	0	NA	0	NA	2	NA
Managerial or equivalent	2	NA	2	NA	1	NA
Professional (no Doctorate)	4	NA	5	NA	1	NA

Note. M=mothers. F=fathers. NA = not applicable. Semi-skilled work = Waitress, Clerk, etc. Technician or Skilled Worker = Automobile Mechanic, Farmer, Carpenter, Electrician, etc. Managerial or equivalent = Store Manager, Restaurant Hostess, Junior Executive, Secretary, etc. Professional (no Doctorate) = Nurse, Engineer, Teacher, etc. Professional (Doctorate or equivalent) = Medical Doctor, Lawyer, Psychologist, College Professor, etc. NDG = Normally developing girls (n = 6), NDB = Normally developing boys (n = 8), DDB = Developmentally delayed boys (n = 7).

The yearly income range for the families involved in this study was from just under $10,000 to over $40,000 per year.

The majority of the families had incomes ranging $11,000 to $40,000 (see Table 7 for distribution of income levels).

Table 7

Distribution of Family Income Levels for Three Groups of Families

Income Level per year	Families with NDG	Families with NDB	Families with DDB
$10,000 or less	1	0	1
$11,000 to $20,000	2	1	5
$21,000 to $40,000	4	4	1
$41,000 or more	1	3	0

Note. NDG = normally developing girls, NDB = normally developing boys, DDB = developmentally delayed boys.

Recruitment of subjects.

A list of intact middle-class families with normally developing preschoolers was obtained from a local suburban nursery school. Twenty-six parents were contacted by phone and sixteen agreed to participate. Of the ten who refused, nine cited scheduling difficulties as the reason for the refusal. In most of these instances, either both parents worked or the father's work schedule was too hectic or erratic to guarantee his participation. Only one set of parents refused because of their reluctance to be video-taped.

The participation of middle-class families with developmentally delayed preschoolers was more difficult to obtain. Due to recent privacy legislation, direct contact between the principal investigator and the parents was not possible and therefore administrators and teachers had to be used as liaisons to parents. This indirect communication system was generally inefficient and ineffective. Superintendents or Directors of Pupil Personnel from nine public schools were contacted to no avail. Eight directors of preschool intervention programs that were not affiliated with public schools were also contacted and one family was obtained from these sources. Two pediatricians and sixteen individuals, whose group membership or professional involvement in related fields brought them in contact with special children, were also contacted. As a result of the cooperation and interest of the two pediatricians, 51 parents were contacted by mail (see appendix D for letter to parents). Those who responded positively were contacted by phone in order to make appropriate arrangements and to check on the suitability of the family.

Eleven families who had indicated their willingness to participate were seen, tested and taped. Of these only seven proved suitable for inclusion in this study. Two boys scored above our test criteria for the developmentally delayed population and one boy was too old. Two children were girls whose chronological age and developmental levels were too disparate to permit considering them as a group. They could not be included with the boys since early analyses indicated that there were some significant differences between children. which were related to their sex. Therefore, for this study only the results of interactions between seven developmentally delayed boys and their parents will be reported.

Settings and Equipment for Laboratory Sessions

Settings for laboratory sessions.

All sessions took place in a room equipped with a one-way observation window through which the video taping was done. All of the normally developing children (NDC) and their parents, and two of the families with developmentally delayed boys (DDb) were seen at the University Community Clinic facility of the Department of Psychology at the University of Hartford. Three of our families with developmentally delayed boys were observed at the Mystic Oral School in Mystic. Connecticut. Two other families with developmentally delayed boys were observed in the facilities of the Department of Educational Psychology of the University of Connecticut at Storrs. The different laboratory settings were required in order to minimize the commuting for parents.

Each room was provided with a table and four adult sized straight backed chairs. Two chairs were placed at the table at right angles to one another and provided seating for the parent and for their child. The third chair was placed next to the parent and the box of free-play toys was placed on it so that they would be accessible. The remaining chair was placed out of the viewing range of the parent and child and the block sorting materials were placed on it after they had been shown to the parent.

Audio-Visual equipment.

An Electrovoice dynamic 150 ohms lavalier microphone was mounted on the ceiling and lowered over the seating area with a five foot retractible cord. This arrangement made it possible to have the microphone between the two speakers yet out of their direct visual fields. The microphone was connected to an Electrovoice line matching transformer and was connected to an audio amplifier. For monitoring purposes, an voice-coil wall speaker and baffle were provided in the observation room. The verbal interactions were transmitted through the amplifier into a monophonic cassette tape recorder.

A Sony Video Camera, which included a tripod and zoom lens, was used for video taping the sessions. The camera was adjusted to accomodate for the reduced light available while video taping through the observation window.

The televised recordings were monitored with a black and white video play back unit.

The Semi-Structured Free-Play Activity

Toy materials.

The semi-structured free play segment of the sessions was delimited by the toys that were provided to parents, and by instructions that they use those toys to "show" their children "new ways to use familiar toys, or how to use unfamiliar toys."

Toys were selected to be appropriate to the skills and interests of a wide range of preschoolers. A variety of types of toys were provided so that parents could find materials for teaching purposes which they, and their children would either be familiar with, or that would capture their interests.

A large cardboard box was used as the toy box. The toys contained in the box were:

(1.) Four puzzles which differed in their levels of difficulty.

a. Vehicles. An 8 piece inset puzzle. Fisher price Co.

b. Rabbit, #275-22. A 10 piece jigsaw puzzle. Playskool Co.

c. Toytown, a 30 piece, series 1 wooden jigsaw puzzle. Philmar Co.

d. Sheltered Kittens, #4429. A jigsaw puzzle with 63 extra large interlocking cardboard pieces. Whitman Co.,

(2.) Three books having different levels of difficulty.

a. Kaufman, J. Things in my House. New York: Golden Press, 1968.

b. Kraus, R. A Hole is to Dig: A First Book of Definitions. New York: Harper & Row, 1952.

c. Yashima, T. Crow Boy. New York: Viking Press. 1955.

(3.) Ten toys that required motor manipulation and could be used for constructions purposes.

a. Small Beads and Laces, #470. Milton Bradley Co. Wooden beads shaped in 1/2 inch cubes, spheres, and cylinders in six colors. Two laces were provided.

b. Playskool Disney Wood Safety Blocks, #214. Milton Bradley Co. Thirty 1 and 5/16 inch wooden blocks embossed with Disney characters and alphabetic letters, in non-toxic colors.

c. Playtiles. Halsam Co., a division of Playskool. Toy contains two boards for inserting small tiles that came in four colors and three shapes.

d. Walt Disney's Huey, Dewey, and Louie Coloring Book. A Whitman Book, Western Publishing Co., Racine, Wisconsin.

e. Eight Crayola Jumbo Crayons, Fluorescent Colors. Binney & Smith Co. Non-toxic crayons.

f. Tru-tone No-roll Semi-pressed Crayons, #9157. Milton Bradley Co.

g. Plast-i-clay Modeling Clay. American Art Clay Co. Non-toxic clay bars in four colors.

h. Cushion Grip Scissors, 5 inch clip point, #21155. J.L. Hammett Co.

i. Twelve sheets of Standard White Newsprint Paper, unruled, 8 1/2 x 11 inches, #10863. J.L. Hammett Co.

j. Elmer's Glue-All, Borden, Inc. Four fluid ounces, squeeze bottle of non-toxic white glue. Borden, Inc.

(4.) Four toys tha required conceptual skills and/or specific rules.

a. Six Nested Cups. A Child Guidance Toy. A set of six sided plastic cups varying in size from smallest to largest. These cups can be nested into each other by size, or interlocked and stacked by size.

b. Face Matching, #J0480. Creative Playthings, Twenty-four wooden plaques, 2 and 3/8 inches square, non-toxic. Six types of faces are silk screened on the plaques so that six groups, each containing 4 matching plaques, can be created.

c. Beaded Alphabet, #1a. Touch, Inc., Albany, New York. Manuscript lower case letters are glued on cardboard cards.

d. Checkers and 5 other Games, #4140. Milton Bradley Co. Set includes black and red checkers, a pair of dice, and instructions for 5 games with various rules that can be played with the materials.

The toys actually used by each dyad were recorded and the number of toys used was totaled to provide a comparative measure of variety. For analysis purposes, those toys that could be utilized without understanding a fixed set of rules, or which did not require abstract conceptualizations, were referred to as "Easy Toys". Those toys which involved the use of game rules, and abstract conceptualizations, were referred to as "Hard Toys". Included as Easy Toys were: the Vehicle and Rabbit puzzles (1a, 1b), the beads and laces (3a), the wooden blocks (3b), the coloring book and crayons (3d, 3e, & 3f), the clay (3g), the scissors (3h), the glue (3j), the paper (3i), and the nested cups (4a). Included as Hard Toys were: the Toytown and Kittens jigsaw puzzles (1c & 1d), all of the books (2a, 2b, & 2c), the Playtiles (3c), the Face Matching game (4b), the alphabet cards (4c), the Checkers game, and the dice included in the checkers game materials (4d).

The Structured Block Sorting Task Activity

Block sorting task materials.

The identical materials were used for both versions of the task. Only the sorting criteria, and therefore, the instruction cards were altered.

Fourteen wooden blocks were painted and marked so that each block could be categorized by its attributes of color, shape, height, or letter mark. The four colors used to paint the blocks were yellow, blue, green, and red. All blocks were finished with a coat of polyurethane to protect them from wear. Blocks were either "tall" (3 1/2 inches) or "short" (1 and 3/4 inches) and also either cylindrical columns or rectangularly shaped. Each block had either a white letter "X" or "O" painted on both of its ends. Eight blocks were placed in a transparent plastic bag with an instruction card and presented to the parent as the blocks to use to teach the task. An additional four blocks were contained separately in a smaller plastic bag. Parents were told that these "extra blocks" were to be presented to the child for placement once the parent felt the child understood the sorting task. Two blocks were withheld by the experimenter for purposes of "testing" the child at the end of this structured segment of the session. Parents were informed, that after the child had placed the four "extra blocks", the experimenter would appear and ask the child to add two more blocks to the groupings and to verbally justify their placement of these "testing" blocks. (The form used for recording the block sorting task test results is provided in Appendix E.)

The inside of an 8 1/2 inch by 11 inch box top was partitioned into four equal sections. Two strips of intersecting 3/4 inch masking tape were used to form the partitioned sections. This box top served as the surface on which the block sort groupings were positioned. The four sections helped to emphasize that four different groupings had to be constructed.

Instructions to parents.

Before the start of the parent/child interaction, each parent was taken into the playroom in order to familiarize him or her with the setting, to explain the format of the session, and to show him or her the available toy materials. The experimenter then sat down at the table, invited the parent to join her, and proceeded to demonstrate the particular version of the block sort task that was to be taught to the child. The eight teaching blocks and the instruction card were shown to the parent. The experimenter then began sorting the blocks into the appropriate four groupings. Each matching set of two blocks was carefully placed in one of the partitioned sections of the box top.

While setting up the blocks the experimenter explained the grouping criteria being used, and called the parent's attention to both the relevant and irrelevant attributes of the blocks. If it was the child's second visit, the parent was also told that during the previous session the same materials had been used, but that the grouping criteria had been somewhat different. The previously used criteria were not specified.

The four "extra blocks" in the smaller bag were then presented to the parent. While adding these to the existing groupings, the experimenter explained that they were to be given to the child after the parent felt the child had understood the task. If the child did not place the blocks correctly, the parent was told that they could correct the child and continue to try to clarify the task for the child. Parents were informed that upon completion of the task, the experimenter would reappear with two additional blocks (referred to as the "testing blocks" in the diagram of the materials). The child would then be asked to add these blocks to the established groups and to verbalize the reasons for their placement of the blocks.

Parents were asked if they had questions, and any questions asked were responded to at that time. The experimenter reminded the parent that the instruction card was in the larger bag of blocks. She then placed the block sorting materials on a chair, to the rear of the parent, away from the box of toys and the table and chairs. The parent was alerted to where the materials were being placed.

The instructions for the task were printed on an index card and read as follows:

Block Sorting Task A (height and mark)

Sort into 4 groups:
1. Tall blocks marked with O
2. Tall blocks marked with X
3. Short blocks marked with O
4. Short blocks marked with X

Directions:
Use the eight blocks in the large bag to make groups in the four sections on the cardboard. When your child understands the grouping, present the four blocks in the smaller bag. Have child place these in their correct groups. If child makes errors you may help.

Block Sorting Task B (height and shape)

Sort into four groups:
1. Tall rectangular blocks
2. Short square blocks
3. Tall round blocks (cylinders)
4. Short round blocks (cylinders)

Directions in this task were identical to the ones provided for task A.

Procedures

Parent/child dyads were observed and recorded on video and audio tape while they were engaging in two types of educationally oriented activities. Each child participated in two laboratory sessions scheduled a week or more apart. One session involved the child interacting with the mother.

The other session involved the child interacting with the father. Sessions were counter-balanced for parent sex and for task order.

After the laboratory session with their fathers, all children were individually tested using form A of <u>The Peabody Picture Vocabulary Test</u> (<u>PPVT</u>). This test was administered in order to assess the child's developmental level of verbal intelligence. After the mother/ child session, mothers were asked to be respondents for the <u>Preschool Attainment Record</u> which was administered in order to obtain a score for the child's communication level and an estimate of each child's level of physical, social, and intellectual development. As had been promised, all test results were shared with the parents at the end of the second session.

Prior to the start of each session, the child was given a magazine and told to wait in the outer office. Meanwhile the parent was taken into the playroom, shown the box of toys, and informed about the study.

The parent was told that the initial fifteen minutes of the session was to be devoted to semi-structured free play. The box of materials and the play area that was provided was pointed out. Parents were told in advance that our study was concerned with parental teaching strategies, and that during the first fifteen minutes, they were to use the available materials, either to show their child how to do something they had never done before, or to show their child a new way to use a familiar toy. Parents were told that after the fifteen minute segment of free play ended, the experimenter would knock on the observation window to signal the parent to start teaching the structured block-sort task.

The block sorting task was then demonstrated to the parent. After the demonstration the child was brought into the playroom to join his or her parent for the laboratory session.

Two versions of a structured task were utilized with task assignment counterbalanced for parent sex, child sex, and the presentation order of the two tasks. The first task, Task A, was the block sorting task which had first been developed for use in the Hess-Shipman, et al. (1968) study. Subsequent use of this task (Dolley, 1974; Omsted & Jester, 1972; Shipman, 1973) confirmed that it was particularly useful for eliciting verbal interactions while mothers were teaching their children.

The second task was developed for our study so that we would have equivalent tasks for each parent to teach to their child. Task B represented one of the permutations of the possible sorting procedures which could be utilized without altering the materials in any way. Task A required the child to sort blocks into four groups by matching the blocks for both height and for whether they had been marked with the letter X or an O. Task B involved matching for height and shape but disregarding the letters on the blocks. The colors of the blocks were irrelevant to either task.

Upon completion of the task the experimenter entered the playroom and, as the parents had initially been told, she proceeded to test the child by having the child add two additional blocks to the groupings and verbally justify those placements.

Coding the Data

The audio tapes of each parent/child interaction session were transcribed by a secretary with ample spacing to allow for alterations of the typescript and with a margin that was large enough to permit the coding to be inserted. After the typescripts were completed, the principal investigator listened to the tape and reviewed the entire typescript. Any errors or omissions were corrected, and the corrected copy was used for coding. In all cases, to protect against loss of data, two carbon copies of the typescripts were made and corrections were made on all three copies.

Prior to the actual coding, all coders participated in five, three-hour training sessions. After the 15 hours of training were completed, and inter-rater agreement of 75% or more had been achieved for all the individual categories, the actual coding was begun. Periodic group meetings continued to be held to discuss problems encountered, to arbitrate disagreements between coders, and to clarify and amend the manual as new insights developed. At one point in our coding, it became apparent that we had made substantive changes in the operational definitions of certain categories as we had been clarifying them. At that point, all previously coded protocols were reviewed by the original coders and altered to conform to the updated manual. Changes involved efforts to clarify the categories of structuring, fact-stating versus defining, and to include new categories for coding tag questions, repeated statements, expanded statements, and altered statements.

Coding was done by three undergraduate special education students from a local college and by the principal investigator. Following Bellack et al.'s (1966) procedures, coding for each interaction protocol was done by a team of two coders. One team member was assigned to do the actual coding. The second team member functioned as a reviewer of that coding. Disagreements between the two coders were noted and arbitrated. On the rare occassions when agreements could not be reached, the remaining coders were consulted. Teams of coder/reviewers were rotated so that all 12 possible permutations of coder/reviewer combinations were utilized. No team coded both a mother and a father interaction from the same family and all teams coded interactions from families with normally developing children and developmentally delayed children.

All coding was done in accordance with the manual (see Appendix B). However, practical problems in developing a data entry system[1] for computerizing the raw data necessitated combining some of the sub-categories and entering them as instances of the major category. For example, under the category of object attributes there were 11 possible attributes which could be specifically coded (e.g. color, size). When the raw coded data was entered into the computer, any of these sub-categories was entered as an instance of coding object attributes. While some of the fine details have been lost in this translation process, this procedure made it possible to develop an efficient means for entering the data in a reasonable amount of time, and prevented the amassing of a large amount of data for categories which either did not occur, or were rarely coded.

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[1] The author is deeply indebted to Dr. Robert G. Ryder, Dean of the College of Home Economics and Family Studies and to Jack Davis, coordinator for technical support at The Institute for Social Inquiry at the University of Connecticut in Storrs, for developing the data entry program.

In order to control for variations in the volume of coded behaviors for each participant in the study, percentages, rather than raw frequencies, were used for reporting and analyzing the data that was collected. The raw frequencies coded for each individual, in each behavioral category, was converted into a proportion of the total number of moves coded for that individual. For example, if a mother had been coded as making four responding moves out of a total of 80 moves, the proportion of her responding behavior (RES) would be 4/80 or 5%.

Reliability Study

Procedures for establishing inter-rater reliability.

Determining the reliability of an observation system for investigating the interactions between adults and children presents some difficult problems. The prevalent procedure, in studies of this sort is the calculation of the percentage of inter-rater agreement on limited segments of sample data, coded after the training is completed, and before the actual coding of the data to be analyzed has commenced. Recommendations to use alternative measures for determining reliability have been abundant (Dunkin & Biddle, 1974; Frick & Semmel, 1978; Herbert & Attridge, 1975; Lytton, 1970; Medley & Mitzel, 1963; Reid, 1970, 1973; Reid & Patterson, 1975). Since the research being reported here is exploratory in nature, it seemed particularly important to obtain conservative, yet meaningful estimates of the inter-rater reliability, for the major facets and for the individual behavioral categories of the observation system being utilized. Although ongoing percent agreement checks were calculated during the training period, the actual inter-rater reliability being reported here was calculated in terms of intraclass correlations.

Reid (1970) had indicated that coder's reliability was reduced when their reliability was no longer being overtly assessed. In order to better monitor coder's agreement over time and to avoid a decline in inter-rater reliability, coders were asked to code segments from parent/child interaction typescripts for the reliability study, while they were also involved in coding total parent/child interaction typescripts.

The sample data used in this reliability study consisted of four to five page segments taken from the typescripts of 24 of the 46 parent/child interactions that had been collected. This data sampling represented about 6% of the available data. The segments were selected so that a cross section of page numbers was provided. This selection process was done in order to insure that no single activity aspect of the interactions would predominate in the reliability study. The segments ranged in coded length from

49 to 87 moves. The mean number of moves per segment was 64, with a standard deviation of 11 moves. Only one parent/child interaction per family was selected in order to avoid confounding our reliability measure with the within group effects. Of the 24 segments used to establish reliability, 8 were from interactions between mothers and their normally developing children, 8 were from interactions between fathers and their normally developing children, 5 were from interactions between mothers and their developmentally delayed boys, and 3 were from interactions of fathers with their developmentally delayed boys

The coding procedure used for the reliability study was the same procedure that was utilized for coding the actual data. Each of the 24 parent/child interaction segments was coded separately by two of the possible coder/reviewer teams. As a result there were 48 coded samples that could be used to establish reliability. The data from these 48 samples was pooled so that the data base would be large enough to make meaningful statistical comparisons, and because the actual analysis of the parent/child interactions were to be based on group, rather than individual dyad or family comparisons. The formula utilized for calculating the intraclass correlation coefficients for each of the behavioral categories was:

$$(AB - G) / GV$$

where

AB = The mean of the cross-products of the percentages of behaviors coded in a category by each of the two coder/reviewer teams.

G = The sum of the squares for the grand total of the percentages of behavior coded for a category ($\underline{N}$ = 48 segments).

GV = The variance of the grand total of percentages of behavior coded for a category.

Summary of the Results of the Inter-rater Reliability Study

The same 60 categories were used to code typescripts of the verbal behavior that parents and their children produced while they were engaged in parent/child teaching interactions. Of the 60 categories for parents' behaviors, 27 obtained intraclass correlation coefficients of .70 or more, and are therefore considered to be reliable for the purposes of this study. Since children's behaviors were generally easier to code, 32 of the 60 categories were reliably coded for them. (See Table 8 below.)

Table 6

Coding Categories for Which Inter-rater Reliability Was Established

Reliable for Parents	Reliable for Children
Proportion of Pedagogical Moves	Proportion of Pedagogical Moves
Mean Number of Words per Move	Mean Number of Words per Move
Soliciting	Soliciting
Tag Questions	
Responding	Responding
Initiatory Moves	Initiatory Moves
Reactive Moves	Reactive Moves
Nonverbal Moves	Nonverbal Moves
Not Clear Moves	Not Clear Moves
Substantive Content References	Substantive Content References
	Achievement
	Object Attributes
State-Object Relationships	State-Object Relationships
Operational Knowledge	Operational Knowledge
Representation	Representation
Classification	Classification
Numerical Relationships	
	Substantive-Logical Meanings occurred
	Analytical Processes[a]
	Empirical Processes[a]
	Fact-stating[a]
Explaining[a]	
	Providing or Requesting Substantive Information
Asks Substantive Questions	Asks Substantive Questions
Instructional Content References	Instructional Content References
	Persons
Actions and/or Procedures	Actions and/or Procedures
Cognitive Actions Statements	
	Empirical Processes[b]
Evaluating[b]	Evaluating[b]
Rating	Rating
Positive Rating	Positive Rating

Negative Rating	Providing or Requesting Information
Extra-Logical Processes	Extra-Logical Processes
Initiatory Extra-Logical Processes	Reactive Extra-Logical Processes
Giving Orders	Noncompliance

Note. $r \leq .70$.
[a]Substantive-Logical Meaning category.
[b]Instructional-Logical Meaning category.

Tenuous reliability was attributed to those categories that failed to obtain intraclass correlation coefficients of .70 or above, but that did obtain .75 or above when the Spearman Brown prophecy formula was applied, to estimate the reliability that would have been obtained if 10 times more data had been available for each category. Twenty-two of the categories were tenuously reliable for coding parents' behavior and 21 of the categories were tenuously reliable for coding children's behaviors. Less than half of the categories that were tenuously reliable for parents were also tenuously reliable for children. The remaining tenuously reliable categories were not the same for parents and children. (See table 9 below).

Table 9

Tenuously Reliable Coding Categories

For Parents	For Children
Structuring	
	Tag Questions
Reacting	Reacting
Socio-Emotional Knowledge	Socio-Emotional Knowledge
Achievement	
	Interpersonal Relationships
Physical Knowledge	Physical Knowledge
Object Attributes	
	Numerical Relationships
Substantive-Logical Meanings	
Analytical Processes[a]	
Empirical Processes[a]	
Verbally Demonstrating[a]	Verbally Demonstrating[a]
Providing or Requesting Substantive Information	
	Statements[b]
	Materials[b]
Persons[b]	
	Cognitive Actions[b]
Instructional-Logical Meanings	Instructional-Logical Meanings
	Analytical Processes[c]
Empirical Processes[c]	Empirical Processes[c]
	Fact-stating[c]
Nonverbally Demonstrating[c]	
Verbally Demonstrating[c]	Verbally Demonstrating[c]
Explaining[c]	Explaining[c]
	Negative Rating
Neutral Rating	Neutral Rating
Providing or Requesting Instructional Information	Providing or Requesting Instructional Information
Providing or Requesting Information	
	Initiatory Extra-Logical Processes
Compliance	Compliance
	Giving Orders

Note. Spearman Brown prophecy $r \leq .75$.

[a]Substantive-Logical Meaning categories.
[b]Instructional content categories.
[c]Instructional-Logical Meaning categories.

In addition there were 11 categories for which reliability could not be established when parents' behaviors were coded, and there were 7 categories for which reliability could not be established when children's behaviors were coded. (See table 10 below.)

Table 10

Coding Categories For Which Reliability Could Not Be Established

Unreliable for Parents	Unreliable for Children
	Structuring
Interpersonal Relationships	
Action on or by Object(s)	Action on or by Object(s)
Causality	Causality
Fact-stating[a]	
Nonverbally Demonstrating[a]	Nonverbally Demonstrating[a]
	Explaining[a]
Evaluatory Processes[a]	Evaluatory Processes[a]
Materials[b]	
Analytical Processes[c]	
Fact-stating[c]	
	Nonverbally Demonstrating[c]
Reactive Extra-Logical Processes	
Noncompliance	

[a]Substantive-Logical Meaning categories.
[b]Instructional Content categories.
[c]Instructional-Logical Meaning categories.

In general children's behaviors were less complex, less ambiguous, and when they occurred relatively frequently, they were more reliably coded. The facets of the observation system and the major categories, which represented composites of more specific sub-categories, tended to be reliable, but misleading when compared to the reliability levels that could be established for the individual subcategories they subsumed.

The inability to establish adequate reliability for certain categories was influenced by the relatively infrequent occurrence of certain behaviors, by the complexity and ambiquity of some of the language observed during these interactions, and by the fact that certain individual categories for coding behaviors were not clearly mutually exclusive. Furthermore, it was apparent that situational factors influenced the frequency and type of language behaviors that occurred. These factors need to be specified and considered before these categories can be included for coding and research purposes.

It is suggested that future users of this instrument collect numerous examples of non-ambiguous <u>and</u> ambiguous language behavior to practise their coding procedures on, and that the operational definitions of the tenuously reliable and unreliable categories be expanded and clarified. In the future, reliability studies should make every effort to establish inter-rater reliability for the individual categories that are later to be analyzed and avoid limiting their reliability studies to the maj: categories or facets of this instrument. (A detailed report of the inter-rater reliability results for all the categories is presented in the Appendix F.)

Educational Transactions

In order to obtain a better understanding of how the discourse during educationally oriented parent/child interactions progresses, it was necessary to go beyond the individual moves that were emitted and to investigate larger sequentially ordered interactional segments. Although originally it had been anticipated that the segments under investigation would be the same teaching cycles that Bellack et al. (1966) had developed, it became apparent that teaching cycles, as determined in Bellack et al.'s study, would not accurately reflect the interactional dynamics that this study hoped to explore (see Modification of Teaching Cycles section in Appendix A).

For this study, interactive sequential patterns of parent/child moves were analyzed for transitions in content, and were labeled Educational Transactions[1] (ET): The procedures for analyzing the content transitions provided a means for assessing the type of content being focused on in each move (e.g, substantive versus instructional content), and for classifing the overall content orientation for each educational transactions.

The educational transactions that occurred during the observed parent/child interactions were parsed through the use of a computerized program of rules[2]. The primary rule dictated that a new educational transaction began whenever there was a change in the type of content that had originally been coded. Exceptions to the rule were permitted in order to incorporate moves that were embedded within larger cycles, but would otherwise have been parsed as separate cycles.

Once all the move data had been parsed into educational transactions each transaction was analyzed on several dimensions. The initiator of each transaction was noted and tallied, the number of words spoken during each transaction were determined, the linguistic form of the first pedagogical move of each ET and the initiator for that move was determined, and the content of each move within the ET was identified. Moves were identified as having certain types of content based on whether they had been coded as

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[1] The term "transactions" was originally introduced by Adams and Biddle (1970) who defined them as "...educationally significant combinations of interactions" (p.11).

[2] The program for parsing ETs was developed by Jack Davis, coordinator of technical support at the Center for Social Inquiry, University of Connecticut, Storrs, Connecticut.

having: (1) substantive meaning only, (2) instructional meaning only, (3) both substantive and instructional meanings, or (4) no clear meaning. After utilizing this content identification procedure for each move, content orientations were established to reflect the type of content that was generally focused on during each ET. For the final analyses of ETs the following five categories of content orientation were utilized: (1) substantively oriented (2) instructionaly oriented, (3) combined orientation, (4) no predominant orientation, and (5) unclear ETs. (See table 4 in Chapter I for examples of these categories. Also see chapter 5 for a description of how the content orientation of ETs was determined.)

The duration of ETs was also of interest because there are numerous unanswered questions about how much time, and how prolonged such interchanges are, or should be, in order to insure effective teaching/learning experiences. Escalona (1973), and White and Watts et al. (1973) had noted that didactic interactions between mothers and toddlers (CA 1 to 3 years) in home environments tended to be brief and provoked by events in the environment. Adams and Biddle (1970) who had observed classroom interactions in elementary and high schools reported that the functional, or content aspect of transactions shifted fairly rapidly (about every 40 seconds).

In order to determine the relative duration of the educational transactions that had occurred in this study, the number of moves per ET were counted and categorized as part of the computerized program for analyzing ETs. If one speaker made one or more moves, and the other dyadic participant made no moves, then the ET was counted as an *input*. If both participants made moves within the ET, then it was considered to be a *dyadic transaction*. Dyadic transactions were further categorized in terms of the total number of moves that ensued during the ET. Educational transactions that involved three moves or less were considered *brief transactions*. Educational transactions that involved four through seven moves were considered to be *moderate transactions*, in terms of their duration, and ETs of eight moves or more were labeled *sustained transactions*. (See table 4 in chapter 1 for examples of the durations of educational transactions that were analyzed. Also see the section on Educational Transactions in chapter 5 for a more complete description of how ET types were determined.)

Research Design and Statistical Procedures

The research design for this study was a mixed model 3 X 2 X 2 factorial design that involved repeated measures. The three level between group factor was an independent variable labeled Family Group. Family group assignment was determined by the developmental status and the sex of the child in the family. The three possible groups were: (1) families with normally developing boys (NDB), (2) families with normally developing girls (NDG), and (3) families with developmentally delayed boys (DDB). One of the two level factors was the sex/role of the parent who was interacting with the child. This dichotomous independent variable was used to indicate whether the mother, or the father, had been observed interacting with their child. The remaining dichotomous factor in this design was labeled Activity and referred to the two educational activities being engaged in. The two activities being compared were: (1) a semi-structured free-play activity (SSFP) and (2) a structured block sorting task activity (SBST). The family group assignment was considered a between group factor, while the parents' sex/role and the context of the interaction were considered within group factors.

The dependent variables were: (1) the proportions of discourse variables that parents and their children expressed, and (2) the proportions of each of the types of educational transactions that parents and their children engaged in. These discourse behaviors and the educational transaction behaviors were treated as repeated measures.

To avoid the quantitative distortions which raw frequency counts would have introduced (Lewis & Lee-Painter, 1974; Schacter, Kirshner, Klips, Fredricks, & Sanders, 1974), particularly in comparing normally developing children with developmentally delayed boys, all of the frequency counts for each participant's discourse behaviors were converted into percentages of that participant's total number of moves during each of the activities being compared or described.

In order to test hypotheses 1 through 14, a 3 X 2 X 2 repeated measures design with 2 within subject factors was used. The repeated measures were for Parent Sex/Role and Activity. Analysis of Variances were calculated for all of the reliable and tenuously reliable discourse variables as well as for the educational transaction variables.

Hypotheses 15 through 22 were concerned with the relationship between the block sorting task scores obtained by the children and the proportions of discourse variables and types of educational transactions that occurred. These hypotheses were tested by calculating Pearson product-moment correlation coefficients.

A summary of the coding system follows. The complete manual with operational definitions, examples and coding instructions can be found in Appendix B and C, respectively. A summary of the Columbia Instrument and a complete description of the modifications of that system made for this study can be found in Appendix A.

Summary of The Coding System Used For The Computerized Data Entry Program [1]

(1) EMITTOR: indicates who made the move

Mother (M); Father (F); Girl (G); Boy (B)

(2) TYPE OF PEDAGOGICAL MOVE: reference to function of move

"Initiatory Moves

"Structuring (STR): sets context for subsequent behavior by launching or halting-excluding interaction

"Soliciting (SOL): directly elicits verbal, physical, or mental response; coded in terms of response expected

"Reflexive Moves

"Responding (RES): fulfils expectation of solicitation; bears reciprocal relation only to solicitation

"Reacting (REA): modifies (by clarifying, synthesizing, expanding) and/or rates (positively or negatively); occasioned by previous move, but not directly elicited; reactions to more than one previous move coded REA"[2]

Subscripts: indicate move form

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[1] Names of coding categories are underlined

[2] Bellack et al., *The Language of the Classroom*, p. 38.

Nonverbal (NV): move without verbalization; function inferred from subsequent reflexive move

Noncomprehensible (NCP): verbalization not comprehensible; function inferred from subsequent . flexive move

"Not Codable (NOC): function uncertain because tape is inaudible"[1], or the pedagogical move is so ambiguous that it cannot be categorized.

(3) SUBSTANTIVE MEANING: reference to substantive content related to the areas of knowledge preschoolers are mastering (see Appendix B for complete definitions and examples).

Socio-emotional Knowledge (SEK): knowledge derived from people

Interpersonal Relationships (REL): reference to interpersonal relationships or interactions

Achievement (ACH): reference to mastery, the capacity or incapacity to master, or pride in mastery

Physical Knowledge (PHK): knowledge derived from objects, actions, or events

Object Attributes (OAG): reference to objects and/or their attributes

Action-Object Relationships (DOG): reference to

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[1] Ibid.

action on or by an object or being

State-Object Relationships (SOR): reference to the relationship between objects or beings and their state or condition

Spatial Relationships (SPS): reference to location, direction, or positional relationship of objects or being

Operational Knowledge (OPR): knowledge derived from internal constructions

Causality (COS): reference to causal relationships

Representation (REP): reference to indices, symbols, and language signs, and/or their meanings

Classification (CLS): reference to classification, matching, or seriation

Numerical Relationships (NOS): reference to counting, sequencing, quantifying, and/or numerical relationships

Not Applicable (NA): substantive meaning was not referred to

(4) "SUBSTANTIVE-LOGICAL MEANING: reference to cognitive process involved in dealing with the...[areas of knowledge preschoolers are mastering]."[1] These categories specify the communicative functions of moves that refer to substantive content.

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[1] Ibid.

"Analytic Process: use of language or established rules of logic"[2]

Defining (DEF): general, dennotative, and connotative defining, and/or interpreting statements or phrases

"Empirical Process: sense criterion of truth

"Fact-Stating (FAC): what is, was, or will be without explanation or evaluation; account, report, description, statement of event or state of affairs"[3]

Nonverbally Demonstrating (DNV): demonstrating without verbalizations, or with non-relevant verbalizations

Demonstrating (DEM): demonstrating accompanied by relevant verbalizations

"Explaining (XPL): relation between objects, events, principles; conditional inference; cause-effect; explicit comparison-contrast; statement of principles, theories, or laws

"Evaluative Process: set of criteria or value system as basis for verification"[1]

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[2] Ibid.

[3] Ibid., p. 39.

[1] Ibid.

Opining and/or Justifying (OPN): "personal values for statement of policy, judgment or evaluation of event, idea, state or affairs; direct and indirect evaluation included [and/or] reasons or argument for or against opinion or judgment

"Logical Process Not Clear (NCL): cognitive process involved not clear"[2]

Not Applicable (NA): substantive-logical meaning did not occur

(5) INSTRUCTIONAL MEANING: content references to organization and/or management of instructional aspects of dyadic interactions; nonsubstantive content.

"Statement (STA): verbal utterance [or gesture], particularly the meaning, validity, truth or propriety of an utterance or gesture"[3]

Repeated Statement (STA-R): statement of previous speaker is repeated

Expanded Statement (STA-E): statement of previous speaker is expanded

Altered Statement (STA-A): statement of previous speaker is altered

Materials (MAT): toys and task related materials

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[2] Ibid.

[3] Ibid.

provided for session

Procedure and/or Action (PRCACT): "plan of activities or a course of action [and/or] a performance (vocal, non-vocal, cognitive, or emotional) [or] the specific nature of which is uncertain or complex"[1]

"Action--Cognitive (ACC): action where cognitive process principally involved; thinking, knowing, and so forth

"Person (PER): person as physical object, personal appearance, personal experience"[2]

(6) INSTRUCTIONAL-LOGICAL MEANING: "reference to cognitive processes related to the distinctly didactic verbal moves in the instructional situation"[3] These categories specify the communicative functions of moves that refer to instructional content.

"Analytic Process:"[4] (same as substantive-logical meanings)

Defining (DEF): (same as substantive-logical meaning)

"Empirical Process:" (same as substantive-logical

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[1] Ibid.

[2] Neujahr, The Individualized Instruction Game, p. 25.

[3] Bellack et al. The Language of the Classroom.

[4] Ibid.

meanings)

"*Fact-Stating* (FAC):" (same as substantive-logical meaning)

Nonverbally Demonstrating (DNV): (same as substantive-logical meaning)

Demonstrating (DEM): (same as substantive-logical meaning)

"*Explaining* (XPL):"[1] (same as substantive-logical meaning)

"Evaluative Process:"[2] (same as substantive-logical meanings)

Opining and/or Justifying (OPN): (same as substantive-logical meaning)

Positive/Negative (PON): "solicitation in which request is made for a rating"[3]

Rating (RATE): evaluatory reaction to actions, events, procedures, statements, materials, or people

Positive (POS): "ratings ranging from implicitly positive to distinctly positive"[4]

Neutral (NEU): rating which acknowledges without evaluating

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[1] Ibid.

[2] Ibid.

[3] Ibid.

[4] Neujahr, *The Individualized Instruction Game*, p. 26.

Negative (NEG): ratings which range from implicitly negative to distinctly negative

(7) EXTRA-LOGICAL MEANING: These categories specify the communicative functions of moves that refer to instructional content, but do not have instructional-logical meaning; non-cognitively oriented processes involving behavioral actions and directives

Soliciting a Performance (PRF): "agent directed to carry out the activity

"Prohibiting a Performance (PRO): agent directed to cease or not begin an activity"[1]

Soliciting a Repetition (AGN): "agent directed to repeat his communication

"Asking to be Directed (DIR): emitter requests a directive

"Seeking Permission (RPR): emitter requests permission to perform an activity

"Compliance (CPL): target of a directive begins to carry out activity or indicates intention to do so

"Permitting a Performance (ALW): agent is allowed to carry out the activity

"Alternative (ALT): target of directive indicates a substitute activity he or she will carry out

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[1] Ibid.

"Non-compliance (NCM): target of directive indicates he she will not carry out the directive"[1]

Joking (JOK): agent attempts to be humourous or reacts to humourous event or statement

Word Play (WPL): emitter utilizes words or sounds for pleasure rather than for communicative purposes

(8) NUMBER OF WORDS PER MOVE: number of words per move (counted

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[1] Ibid.

Chapter IV

RESULTS CHAPTER

The main concern of this study is to describe and compare behaviors observed during parent/child teaching/learning interactions. Therefore, a major portion of this chapter is devoted to descriptions and comparisons of the discourse behaviors that occurred during the observed parent/child interactions. These are followed by the descriptions and comparisons of the educational transaction sequences that occurred during the parent/child interactions. The last section of this chapter is devoted to reporting the results of a correlational study that represented an effort to clarify some of the relationships between the processes that were observed and the product (i.e., scores that were obtained by children after they had been taught the block sorting tasks). Tables containing the results for testing all of the hypotheses relevant to the discourse variables, the educational transactions, and the process-product relationships are provided in Appendix H.

Since there were some problems encountered in establishing the inter-rater reliability of certain coding categories, a complete description and some discussion of the reliability study are presented in Appendix F, in order to agument the brief summary provided in the beginning of this chapter. This summary is followed by a summary of the demographic and developmental testing data and the relationship of that data to the block sorting task test scores children obtained. A detailed report of those results is provided in Appendix G.

Throughout this chapter the following abbreviations are used: parents (P), children (C), mothers (M), fathers (F), normally developing children (NDC), normally developing girls (NDG), normally developing boys (NDB), developmentally delayed boys (DDB), semi-structured free-play activity (SSFP), structured block sorting task activity (SBST), and block sorting task test score (BST score). Combined abbreviations are used to indicate, in sequential order, first the emitter of the behavior, second whom they were interacting with, and third during what activity. For example, P/NDG/SSFP denotes parents' behavior emitted while interacting with normally developing girls during the semi-structured free-play activity and C/M BST scores denotes the block sorting task test score obtained after mothers taught the task.

Throughout this chapter, and the discussion chapter which follows, the semi-structured free-play and block sorting task that were observed will be referred to as educationally oriented "activities" and their influence on the behavior of the participants will be referred to as the "context" within which the discourse behaviors and educational transactions occurred.

Whenever tenuous variables are referred to they will be identified by a superscripted t (e.g., structuring^t by parents).

All of the results that are reported as being significant have obtained at least a .05 level of probability.

Sources of Data

For this study each parent was observed for one session as he or she interacted with their preschool child during two educationally oriented activities. The results of the coded discourse behavior of parents and their children are described and comparisons are made between: (1) mothers and fathers as teaching parents, (2) the three types of family groups, (determined by the sex and developmental status of the children), and (3) the behaviors observed during each of two educationally oriented activities, whose imposed structure and prescribed objectives varied.

The data collected from observations of parents interacting with their children was supplemented with some additional data collected by various other means. A questionnaire (see Appendix E) was verbally administered to parents in order to collect basic demographic information. In addition developmental data was collected by having mothers report on their preschoolers' developmental status in response to the Preschool Attainment Record (PAR), a semi-structured interview instrument. Children were given the Peabody Picture Vocabulary Test (PPVT) in order to obtain comparative estimates of their verbal intelligence levels. To further supplement the demographic and developmental data that had been collected, a semi-structured interview instrument, The Cognitive Home Environment Scale (CHES) (see Appendix E), was administered to both parents. This instrument provided additional details about the general home environment, certain child rearing activities that occurred in the home, as well as parents' educational and occupational expectations for the futures of their children. Parents' total CHES scores are provided, but not elaborated upon in this report.

During the semi-structured free play activity the number and types of toys used by each dyad were recorded and classified in terms of their relative complexity. This information, along with the scores that children obtained on the block sorting task test, administered at the end of the structured block sorting task activity, was utilized in a correlational study in order to explore the relationships between certain of the demographic and developmental variables, and the test and task variables.

Summary of the Inter-Rater Reliability Study

In general it appears that children's behaviors are measured more reliably than parent's behaviors. Since children used shorter sentences and less complex syntax, the function of their language was easier to ascertain and ambiguous statements were less likely to occur. It also appears that in many instances the facets, which were based on a composite of related categories (e.g., substantive meanings or substantive-logical meanings), were more reliable than the individual categories within those facets; a fact which is not uncommon for observation systems using large numbers of behavioral categories (Dunkin & Biddle, 1974; Medley, 1975; Medley & Mitzel, 1963).

For purposes of this research study, those categories whose intraclass correlation coefficients were .70 or above are considered reliable. Those categories whose intraclass correlation coefficients were .69 or below, but whose Spearman Brown prophecy coefficient were .75 or above, are considered to be "tenuously reliable". The remaining categories are considered unreliable for this study and further analyses of those categories will not be reported.

Out of the 60 behaviors coded for parents 26 were reliable, 23 were tenuously reliable, and 11 were unreliable. For children 31 of the 60 categories coded were reliable, 22 were tenuously reliable, and 7 were unreliable. Appendix F contains tables indicating the means and standard deviations for all the categories tested and the intra-class and Spearman Brown correlations.

In summary, the results of the inter-rater reliability study for the modified Columbia Instrument must be viewed cautiously because the data from which the reliability estimates were derived were influenced by three elements: (1) the frequencies with which behaviors did or did not occur, (2) the precision of the operational difinitions for the coding categories, and (3) the adequacy of the coding decisions made by each of the coders.

Summary of Demographic and Developmental Test Data

It is not possible with our small sample to make any meaningful generalizations about the relationships between demographic variables, test scores, or task variables, and the BST scores that children obtained. The correlation coefficients for certain of these variables are presented separately for each family group and can be found below in table 11, table 12, and table 13. As can be seen from these tables, for this particular sample, when mothers taught NDB who had a higher degree of measured verbal skills (PPVT MA), these boys performed more successfully on the block sorting task test. A relationship between verbal proficiency on the part of daughters being taught a block sorting task by their mothers or fathers, and the successful outcome of that teaching was not evident in our study. The age of NDG, or rather their lack of age, was related to the BST scores obtained by daughters when their mothers taught them the task. However, this correlation may be an artifact resulting from the fact that two of the youngest girls received the highest scores on the PPVT.

For some of the normally developing children in our study, their sex was related to the BST scores they obtained when their fathers were teaching. Fathers in our study appear to have been more successful in getting their normally developing sons to both place the blocks in the correct grouping and to verbalize their reasons for the placements. When teaching their daughters, fathers were successful in communicating the sorting criteria, but after their father/child interactions.four of the girls did not provide appropriate verbal justifications for their block placements. When mothers were teaching their NDB and their NDG, both of these groups performed significantly more successfully than the LDB children (i.e., they obtained higher BST scores). When fathers were teaching, only the NDB performed significantly more successfully than the DDB. Although the NDG, taught by their fathers, did not perform significantly more successfully than the DDB, taught by their fathers, they did not perform significantly less successfully than their NDB counterparts.

For the NDC the two block sorting tasks utilized for this study appear to have been comparable, although the order in which they were presented did have an impact on these children's scores: NDG performed better when task A was presented first, while NBD performed better when task B was presented first. For the DDB the mean score for task B was higher than for task A, indicating that they performed more successfully on task B, regardless of the order in which it was presented.

Table 11

Correlations Between Demographic, Test, And Task Variables

For Normally Developing Girls

	CA	MA	AA	TaskA	TaskB	BST/M	BST/F
Chronological Age							
Mental Age (PPVT score)	.05						
Attainment Age (PAE score)	.28	.53					
Task A (height & letter)	-.19	.15	.71*				
Task B (height & shape)	-.41	-.22	-.16	.30			
BST score when mother taught	-.78*	-.02	.26	.71*	.45		
BST score when father taught	.15	.06	.50	.76*	.59	.28	
Family income Level	-.32	.65	.15	.17	.15	.10	.21

* $p < .05$.

Table 12

Correlations Between Demographic, Test, and Task Variables

For Normally Developing Boys (n = 9)

	CA	MA	AA	TaskA	TaskB	BST/M	BST/F
Chronological Age							
Mental Age (PPVT score)	.59						
Attainment Age (PAR score)	.36	.45					
Task A (height & letter)	.10	.58	-.11				
Task B (height & letter)	.46	.33	.80*	.14			
BST score when mother taught	.41	.80*	.40	.63*	.60		
BST score when father taught	.13	.16	.46	.03	.78*	.24	
Family Income Level	.53	.09	.37	-.34	.52	-.60	.72*

* $p < .05$.

Table 13

Correlations Between Demographic, Test, And Task Variables

For Developmentally Delayed Boys (n = 7)

	CA	MA	AA	TaskA	TaskB	BST/M	BST/F
Chronological Age							
Mental Age (PPVT score)	.11						
Attainment Age (PAR score)	-.13	.28					
Task A (height & letter)	.47	.76*	.56				
Task B (height & shape)	.42	.46	.45	.81*			
BST score when mother taught	.64	.63	.54	.96***	.84*		
BST score when father taught	.14	.45	.11	.54	.86*	.51	
Family Income Level	-.40	-.04	.41	-.17	-.16	-.15	-.16

* $p < .05$. *** $p < .001$.

Tables and details of the demographic and developmental testing data are provided in Appendix G.

DISCOURSE BEHAVIORS

The discourse behaviors reported here were tested by Family Group (NDG, NDP, DDB) by Parent Sex/Role (mother or father) by Activity (semi-structured free play or structured block sorting task) by repeated measures (78 discourse variables) ANOVAS with alpha set at .05. Since the focus of this study is on discerning the behaviors of dyadic participants rather than comparing dyads, the mean proportions for the discourse behaviors of parents were determined by dividing the frequencies for each of the parents' discourse behaviors by the total number of moves each of them had emitted during each of the two activities. In an identical manner, the frequencies of occurrence for each of the children's discourse behaviors were divided by the total number of moves they had emitted during each of the activity segments. Certain variables whose proportions were not calculated in this way are reported also, and the calculations involved are specified as these variables are presented.

After presenting an overview of the results for the coded discourse behaviors, the specific behaviors that were analyzed are reported in six separate ections arranged by facets (i.e., Pedagogical Move Types, Substantive Meanings, Substantive-Logical Meanings, Instructional Meanings, Instructional-Logical Meanings, and Extra-Logical Meanings). In order to provide a coherent presentation, a consistent format is followed. The results for each of the reliably coded parent behaviors precedes the reporting of results for each of the reliably coded child behaviors

The results for each of the facets will initially be presented in the form of three summary tables. The first table includes mean proportions for the reliably coded parent behaviors in terms of the three possible main effects (i.e., Family Group, Activity and Parent Sex/Role). The second table is an identical table summarizing the mean proportions for the children's reliably coded behaviors. The third table includes the $\underline{F}$ ratios obtained when the parent and child behaviors were analyzed. A brief description of the significant results of those analyses follow the tables. Additional tables are interspersed throughout the text in order to clarify the significant interaction effects that are reported.

The reader is reminded that any proportions reported for parents' and children's behaviors are not directly comparable since the denominators used to determine these proportions were different (e.g., 50% of parents' moves may be equal to 150 moves, while 50% of children's moves may only be equal to 100 moves). Only the results for the reliable discourse variables are reported in this chapter.

<u>Overview of Discourse Behaviors</u>

A grand total of 26,295 moves, involving the use of 122,113 words, were coded for the 46 dyads that were observed for this study. Of these, 16,374 moves resulted from 32 parents interacting with their 16 normally developing children (NDC) and 9,921 moves resulted from 14 parents interacting with their 7 developmentally delayed boys (DDB). When mothers and their NDC interacted these dyads were coded as having made a total of 7,917 moves, a somewhat smaller number of moves than the 8,457 moves that were coded for fathers and NDC. On the other hand more moves were coded when mothers interacted with their DDB (5,116) than when fathers interacted with their DDB (4,603). As can be seen from Table 14 below, the mean (M) number of moves for dyad from the three family groups did vary and the largest discrepancy was between mother/DDB interactions and father/DDB interactions.

Table 14

Mean Frequencies for Moves by Dyads During the Entire Observed Interactions

Dyads	FAMILY GROUPS NDG (n=8)	NDB (n=8)	DDB (n=7)	ALL (N=23)
M/C dyads	384	344	431	386
F/C dyads	356	343	367	355
P/C dyads	370	343	399	371

Note. NDG = normally developing girls. NDB = normally developing boys. DDB = developmentally delayed boys. All = across all children regardless of sex or developmental status. M/C = mother and child. F/C = father and child. P/C = parents and child.

The semi-structured free-play (SSFP) segment of each session lasted for 15 minutes. During the SSFP activity parents and their NDC produced a total of 11,408 moves, or 69% of all of their moves during the entire session. Parents and their DDB produced 5,589 moves during the SSFP activity, which represented 56% of all of their moves.

The structured block sorting task (SBST) activity was not restricted by a time limitation. As was expected, parents and their DDB devoted a larger percentage of their total moves to this structured task (3,874 moves, representing 39% of all their moves) than did parents and NDC, who produced a total of 4,260 moves, or 26% of all their moves. It should be noted that for all P/NDC dyads, the SBST activity appeared to be shorter in duration than the 15 minute SSFP activity; however, for P/DDB dyads, the SBST activity seemed to take much longer than the 15 minutes allotted for the SSFP activity. (Unfortunately the SBST activity was not timed so these impressions cannot be confirmed.)

The mean number of moves produced by parent/child dyads during the two educationally oriented activities was significantly influenced by the Family Group factor and by the Activity factor, as is clear from the figures in Table 15.

Table 15

Mean Number of Moves by Parent/Child Dyads during Educational Activities

Family Group[a]			Activity[b]		Parent Sex/Role	
NDC	NDB	DDB	SSFP	SBST	M	F
252	236	338	371	180	276	275

==

[a]Significant main effect for Family Group ($F = 6.97$, $p < .01$).

[b]Significant main effect for Activity ($F = 53.56$, $p < .001$).

The transition segment (TRANS) of the session began when the parents were signalled to end the semi-structured free-play activity, and lasted until the first substantively oriented move referring to the block sorting task had occurred. In general, this period was brief and the proportion of moves involved were similar for all groups of dyads. During the transition period parents and their NOC produced 744 moves, or 4.5% of their total number of moves. Parents and their developmentally delayed boys produced 458 moves during the transition period, which represented 4.6% of their moves. Only results obtained during the semi-structured free-play activity and the structured block sorting task activity will be included in this report.

Out of all the moves coded, less than 1/4 of one per cent were unclear and therefore could not be classified. This minimal figure includes only moves that could not be coded because they were inaudible, extremely abbreviated, poorly articulated, or syntactically confusing.

The results of the univariate ANOVAS (Family Group X Parent Sex/Role X Activity) that were calculated indicated that, in general, the activity being engaged in (i.e., the context), was quantitatively, the most influential of the factors affecting the participatory discourse behavior of children and their parents. Out of a total of 38 ANOVAS, used to compare parents' discourse behaviors during the semi-structured free-play activity (SSFP) with their behaviors during the structured block sorting task activity (SBST), a significant main effect for activity was indicated for 25 of these behavioral measures. The ANOVAS for the 40 variables that measured children's discourse behavior during the two educationally oriented activities, indicated that there was a significant main effect for Activity on 22 of these variables.

The second most potent differentiating factor was the developmental and sexual status of the children in the families that were observed. Families had been assigned to one of three possible "family groups" (NDG, NDB, DDB) based on their child's sex and developmental status. For 17 of the parents' discourse behaviors, their family group assignment was a significant factor; furthermore, for an additional seven parental discourse variables, Family Group interacted significantly with the activity that the dyads were engaged in. For the children, 10 of the behavioral discourse variables were significantly affected by their developmental/sexual status and nine of the measures of discourse behavior were affected by the interaction between their family group and the activity engaged in.

Parent Sex/Role differences only had a significant influence on five of the parental discourse variables and on six of the children's discourse variables. Significant interactions between Parent Sex/Role, and the Activity and/or the Family Group found affected six child discourse variables. A significant three-way interaction, involving the Parent Sex/Role factor, was obtained for one of the parent's discourse behaviors.

Pedagogical Move Types

In comparing the mean frequencies for the total number of moves that dyads had produced during the SSFP and the SBST activities, significant main effects were revealed for family group assignment (F =7.0, p <.01) and for the activity that had been engaged in (F =53.6, p <.001). In general, the least number of moves were emitted during the interactions between P/NDB (M =236) and the most number of moves were emitted during interactions between P/DDB (M =338). The mean number of moves for P/NDS was 252, which was also considerably less than the number of moves emitted during P/DDB interactions. All of the dyads emitted more moves during the SSFP activity, than during the SBST activity (SSFP M =371, SBST M =180).

Mean percentages and frequencies for the types of pedagogical moves emitted by the three family groups during their parent/child interactions are presented in Tables 16 and 17.

Table 16

Mean Percentages of Mothers' and Fathers' Pedagogical Moves for Family Groups, Activities, and Parents' Sex/Role

Pedagogical Move Types	Family Group NDG	NDB	DDB	Activity SSFP	SBST	Parent M	F
	Mean Percentages for Discourse Behavior						
% of Moves[bc]	58	58	58	56	60	59	56
M # Words per move[ab]	6.3	7.1	5.2	5.9	6.6	6.5	5.9
Linguistic Form of Moves							
SOLiciting[a]	42	39	51	44	44	43	46
Tag Question[bd]	6	5	3	4	6	4	5
RESponding[b]	8	9	5	8	6	7	8
Nonverbal[b]	1	1	1	2	1	1	1
Not Clear	.05	.15	.11	.14	.06	.12	.08
Composite Variables							
Initiatory[b]	52	49	58	51	55	52	54
Reactive[b]	48	51	42	49	45	48	46
ASKSBS[b]	16	15	21	14	21	19	17
ASKINS[bc]	23	21	21	26	16	19	23
SUBSOL[b]	38	38	40	31	47	42	36
INSSOL[ab]	54	54	40	60	39	47	52
ANSWER	64	57	51	56	58	59	55

Note. ASKSBS = the proportion of all moves by a speaker that were coded as solicitation having substantive-logical meaning, ASKINS = the proportion of all moves by a speaker that were coded as solicitations having instructional-logical meaning. SUBSOL = the proportion of all soliciting moves by a speaker that were coded as having substantive-logical meaning. INSSOL = the proportion of all soliciting moves by a speaker that were coded as having instructional-logical meaning. ANSWER = the proportion of responding moves by one speaker to soliciting moves by the other speaker.

[a]Significant main effect for Family Group.

[b]Significant main effect for Activity.

[c]Significant main effect for Parent Sex/Role.

[d]Significant three-way interaction effect for Family Group X Activity X Parent Sex/Role.

Table 17

Mean Percentages of Children's Pedagogical Moves for Family Groups

Activities, and Interactions with Their Mothers and Fathers

Pedagogical Move Type	Family Group NDG	NDB	DDB	Activity SSFP	SBST	Parent M	F
	Mean Percentages for Discourse Behavior						
% of Moves[bc]	42	42	42	44	40	40	44
M # Words per Move[abe]	3.3	3.3	1.6	3.0	2.5	2.6	2.9
Linguistic Form of Moves							
SOLiciting[bf]	16	19	14	18	15	15	17
RESponding[b]	41	39	49	40	46	44	42
Nonverbal[b]	16	12	18	11	20	17	14
Not Clear[bd]	.06	.40	.07	.27	.10	.28	.09
Composite variables							
Initiatory[bf]	20	21	14	21	16	17	19
Reactive[bf]	80	79	86	79	84	83	81
ASKSPS	4	4	2	4	3	4	3
ASKINS	10	12	8	11	9	9	11
SUBSOL[c]	24	25	14	22	20	24	18
INSSOL[g]	61	59	59	60	59	57	62
ANSWER	69	69	69	68	70	68	71

Note. ASKSPS = the proportion of all moves, by a speaker, that were coded as solicitations having substantive-logical meaning. ASKINS = the proportion of all moves that were coded as solicitations having instructional-logical meaning.

SUBSOL = the proportion of all soliciting moves that were coded as having substantive-logical meaning. INSSOL = the proportion of soliciting moves that were coded as having instruction-logical meaning. ANSWER = the proportion of one speaker's responding moves, to the other speaker's soliciting moves.

[a]Significant main effect for Family Group.

[b]Significant main effect for Activity.

[c]Significant main effect for Parent Sex/Role.

[d]Significant interaction effect for Family Group X Parent Sex/Role.

[e]Significant interaction effect for Family Group X Activity.

[f]Significant interaction effect for Parent Sex/Role X Activity.

[g]Significant three-way interaction effect for Family Group X Parent Sex/Role X Activity.

A summary of ANOVA results for the pedagogical moves emitted by parents and their children is provided in Table 18. A report of the significant results is presented after the table.

Table 18

Summary of Analyses of Variance for Pedagogical Move Types:

Family Group X Parent Sex/Role X Activity

(with repeated measures for Parent Sex/Role And Activity)

Pedagog-ical Moves	Family Group (A)	Parent Sex/Role (B)	Activity (C)	AXB	AXC	BXC	AXB XC
	F Ratios for Discourse Behavior (*df* 2,1,1,20)						
Moves by P	.04	7.62*	13.43**	1.36	.34	.50	.68
Moves by C	.07	8.20**	12.64**	1.24	1.08	.24	.71
P Words per move	17.54***	3.38	7.58*	.34	.09	.22	.81
C Words per move	14.00***	3.63	13.26**	.80	3.69*	.01	.29

P SOLiciting	6.57**	2.57	.02	.11	1.65	.72	.18
C SOLiciting	.91	1.63	5.47*	.31	1.86	4.89*	.20
P Tag Question	3.36	1.55	7.35*	2.51	.41	1.01	3.71*
P RESponding	1.66	1.20	4.52*	.65	2.40	3.42	.11
C RESponding	2.01	.20	6.61*	.16	.56	.96	.18
P Nonverbal	.73	.02	7.79*	2.87	.27	1.14	.19
C Nonverbal	1.67	2.23	21.19***	.04	.34	.64	.87
P Not Clear	1.45	1.34	3.42	.77	2.56	2.16	.35
C Not Clear	2.32	3.00	5.77*	3.86*	.05	.01	.88

F Ratios for Composite Variables (*df* 2,1,1,20)

P Initiatory (SOL+STR)	3.25	1.67	9.43**	.19	1.66	.01	.47
C Initiatory (SOL+STR)	1.93	2.40	10.11**	.12	2.29	8.82**	.02
P Reactive (RES+REA)	3.25	1.67	9.43**	.19	1.66	.01	.47
C Reactive (RES+REA)	1.93	2.40	10.11**	.12	2.29	8.82**	.02
P ASKSBS	2.78	.07	16.73***	.50	1.51	.09	.81
C ASKSBS	.75	1.28	.47	1.07	.37	1.83	.51
P ASKINS	.49	9.26**	37.73***	1.03	.90	.09	.65
C ASKINS	.94	2.50	2.75	.27	1.04	3.67	.89
P SUBSOL	.17	3.16	20.75***	1.16	1.97	.08	1.42
C SUBSOL	1.94	5.40*	.07	1.11	.30	.16	.45
P INSSOL	6.69**	3.42	42.49***	.66	.26	1.21	.96
C INSSOL	.04	2.04	.04	1.95	.51	1.24	4.40*

P ANSWER	2.98	.29	.21	1.28	2.42	.05	.65
C ANSWER	.03	1.14	.82	1.53	1.42	3.43	1.84

Note. Only coding categories for which inter-rater reliability ($r \leq .70$), has been established are included in this table. P = parents. C = children. ASKSBS, ASKINS, SUBSOL, INSSOL, and ANSWER are defined in Tables 16 and 17.

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Parents' pedagogical moves.

Fourteen parental discourse varivables were analyzed for the Pedagogical Move Type facet. Analyses of variance indicated that there was a significant main effect for Family Group differences for only three of these variables. As was expected, parents did modify their language behavior when interacting with their DDB. Parents used less words per move with their DDB (F = 17.54, $p <.001$) and they solicited them more frequently. When parents addressed soliciting moves to their children, the parents of DDB emitted less solicitations that referred to instructional content (INSSOL) than the parents of NDG or NDB did.

Tag questions are a special kind of solicitation. For parents they seem to function either as diagnostic probes (e.g., "..., *understand* ?") or as attention markers (e.g., "Now you're gonna do it, *okay* ?"). Tag questions were influenced by a significant three-way interaction effect between Family Group, Parent Sex/Role, and Activity. As can be seen from Table 19, below, the parents of NDC increased their use of tag questions during the SBST activity. Particularly notable was the fact that mothers more than doubled their use of tag questions during the SBST activity when they were interacting with their normally developing daughters, while fathers more than doubled their use of tag questions during the SBST activity when interacting with their normally developing sons. However, parents interacting with their DDB during the SBST activity, only increased their use of tag questions slightly.

Table 19

Mean Percentages of Tag Questions by Mothers and Fathers During Two Educationally Oriented Activities

Family Group	SSFP Activity mother	SSFP Activity father	SBST Activity mother	SBST Activity father
NDG	3%	6%	7%	7%
NDB	4%	4%	5%	9%
DDB	3%	2%	4%	3%

Note. SSFP activity = semi-structured free-play activity. SBST activity = structured block sorting task activity. Significant three-way interaction term for Family Group X Parent Sex/Role X Activity $F = 3.71$, $p < .05$.

With the exception of soliciting moves by parents, the relative quantity of pedagogical moves, the linguistic functions of those moves, and the qualitative aspects of those moves, as measured by the composite variables, were generally not influenced by the sex and/or developmental status of the children (i.e., Family Group). The only other significant difference between the family groups was the mean number of words they used per move. This particular result was highly predictable, considering that one of the critieria for selecting the three groups of children was that the DDB had to have expressive language deficits.

Although the empirical observations and the raw frequency data support the impression that the NDC performed qualitatively quite differently from the DDB, the relative quantitative similarities in their use of various types of pedagogical moves had not been anticipated.

The sex and role of the parent (i.e., mothers versus fathers), was not significantly related to their use of linguistic forms. The mean total number of pedagogical moves per dyad, during mother/child interactions and during father/child interactions, also did not differ; however, the proportion of moves that each parent contributed to the interactions did differ significantly. Mothers generally contributed a higher proportion of moves when they interacted with their children than fathers did when they interacted with their children. This result may be partially related to a slight trend for mothers to use more words per move than fathers did (t = 3.38, p <.09). Increases in the number of words used would increase the possibility that additional moves could occur.

The activity being engaged in had an influence on the occurrence of five of the seven linguistic forms that parents could use to express their pedagogical moves. Activity also had an influence on six of the seven composite variables that were analyzed. Although generally more moves were emitted by parent/child dyads during the SSFP activity, both the proportion of moves that parents contributed to the interactions and the number of words per move that they uttered increased during the SBST activity. The proportion of soliciting moves that parents emitted did not increase between the two activities; however, since parents did increase their use of structuring[1] moves (F =18.53, p <.001), their initiatory moves, a composite of soliciting and structuring moves, did increase significantly during the SBST activity. Parents' use of tag questions, which appear to function as attention markers and/or diagnostic probes, increased during the SBST activity. In addition, both the proportion of all parent moves which were solicitation that referred to substantive content (ASKSBS), and the proportion of parents' solicitation moves that referred to substantive content (SUBSOL), increased during the SBST activity.

Certain pedagogical moves were more frequently emitted during the SSFP activity. During the SBST activity parents' reactive moves decreased significantly. Since children

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[1] Although structuring moves were only tenuously reliably coded, initiatory moves were reliable.

emitted a significantly higher proportion of soliciting moves during the SSFP activity, their parents emitted a higher proportion of responding moves; however, the ratio of parents' responses to children's soliciting moves (ANSWER) remained relatively constant during the two activities (SSFP $\underline{M}$ =56%, SBST $\underline{M}$ =58%). Although the proportion of moves that parents' devoted to solicitations did not vary as a result of the changing context (i.e., which activity they were engaged in), the content references of those solicitations did vary significantly. During the SSFP activity parents devoted a higher proportion of their pedagogical moves to solicitations about instructional aspects of the activity (ASKINS). They also allotted a higher proportion of their soliciting moves to references focusing on instructional content (INSSOL).

Children's pedagogical moves.

Thirteen of the children's pedagogical move type behaviors were analyzed. Of these only one, the mean number of words used per move, differed significantly between the three groups of children. On the average, NDC used twice as many words per move as their language delayed cohorts, the DDB. The Activity by Family Group interaction was significant and reflected a relatively large decrease in verbalization by NDB during the SBST activity.

Table 20

Mean Number of Words per Move by Children during Two Educational Activities

Family Group	SSFP Activity	SBSI Activity
NDG	3.54	3.10
NDB	3.71	2.81
DDB	1.61	1.57

Note. Family Group X Activity interaction term $F = 3.89$, $p < .05$.

An interaction between Family Group and Parent Sex/Role was found to be related to the very small proportion ($M < .20\%$) of children's moves coded as not clear. The NDB emitted more of these unclear moves when interacting with their mothers than either the NDG or the DDB did.

The sex and/or role of the parent they were interacting with directly influenced the proportion of moves that children contributed to the dyadic interactions. All three groups of children contributed a significantly higher proportion of moves when interacting with their fathers. Although the overall proportion of all children's pedagogical moves that were solicitations about substantive content (ASKSBS) was not influenced by the sex/role of the parent they were interacting with, the proportion of children's soliciting moves that were devoted to substantive content (SUBSOL) was significantly higher when they were interacting with their mothers.

A significant three-way interaction between the Family Group, Parent Sex/Role, and Activity factors reflected a complex relationship between these three factors and the proportion of children's soliciting moves that referred to instructional content (INSSOL). As can be seen from Table 21, which follows, the largest shift in this form of discourse behavior was exhibited by NDB. During the SBST activity, when NDB were interacting with their fathers, they increased their use of INSSOL moves. When interacting with their mothers during the SBST activity, NDB decreased their INSSOL moves. The NDG and DDB both increased their use of INSSOL moves during the SBST activity when they were interacting with their mothers. When interacting with their fathers during the SBST activity, the DDB increased their proportion of INSSOL moves, but the NDG reduced their proportions of these moves.

Table 21

Mean Percentages of Children's INSSOL Moves During

Educational Activities with Each Parent

Family Group	SSFP Activity Mother	SSFP Activity Father	SBST Activity Mother	SBST Activity Father
NDG	58%	63%	65%	57%
NDB	64%	62%	39%	71%
DDB	56%	58%	60%	63%

Note. Significant three-way interaction term for Family Group X Parent Sex/Role X Activity $F = 4.40$, $p < .05$.
INSSOL = the proportion of children's soliciting moves that referred to instructional content.

The activity that was being engaged in had an influence on eight of the thirteen pedagogical move types utilized by children. During the SSFP activity children contributed a higher proportion of moves to the dyadic interactions and they uttered a higher mean number of words per move than they did during the SBST activity. Although there were very few moves by children that were coded as not clear, more of these occurred during the longer and less structured SSFP activity. During the SSFP activity, while parents used a somewhat lower proportion of their pedagogical moves for initiatory purposes (i.e., soliciting and structuring), children used a higher proportion of their pedagogical moves for initiatory purposes. This was largely due to the fact that they emitted a higher proportion of soliciting moves during the SSFP activity. In addition, there was a significant two-way interaction effect for Activity and Parent Sex/Role which influenced children's use of soliciting moves, and therefore also their use of initiatory moves (i.e., the sum of soliciting and structuring moves). As can be seen from Table 22 below, all of the children decreased the proportions of soliciting and initiatory moves that they addressed to their mothers during the SBST activity. Such a substantial decrease in soliciting moves or in initiatory moves did not occur when children interacted with their fathers during the SBST activity.

Table 22

Mean Percentages for Children's Soliciting and Initiatory Moves Children During Educational Activities

Parent Sex/Role	SSFP Activity	SBST Activity
Soliciting Moves with		
Mother	18%	12%
Father	17%	17%
Initiatory Moves with		
Mother	21%	13%
Father	20%	19%

Note. Parent Sex/Role X Activity interaction term for soliciting moves $F = 4.69$, $p < .05$; for initiatory moves $F = 8.82$, $p < .01$.

During the SBST activity nonverbal moves by children increased significantly. Responding moves by children also increased significantly during the SBST activity. Although reacting moves by children did not vary significantly between the two activities, reactive moves by children (i.e., the sum of responding and reacting moves) did increase significantly during the SBST activity, particularly during the mother/child interactions. Table 23, below, provides the mean percentages for children's reactive moves.

Table 23

Mean Percentages of Children's Reactive Moves during Educational Activities

Parent Sex/Role	SSFP Activity	SBST Activity
Reactive moves with		
Mother	79%	87%
Father	80%	81%

Note. Parent Sex/Role X Activity interaction term $F = 8.82$, $p < .01$.

Substantive Meaning

As can be seen from the tables which follow, the substantive content that was referred to was often influenced by the family group assignment and/or the activity being engaged in. Table 24 presents the mean percentages for the substantive content references by parents. The mean percentages for the substantive content references by children are presented in Table 25.

Table 24

Mean Percentages of Mothers' and Fathers' References to Substantive Content for Family Groups, Activities, and Parents' Sex/Roles

Substantive Meaning	Family Group NDG	NDB	DDB	Activity SSFP	SBST	Parent M	F
	Mean Percentages for Discourse Behavior						
Substantive Content References[bcd]	77	75	81	72	83	80	75
Specific Substantive Content Reference							
Physical Knowledge							
State-Object Relationship[abd]	13	13	20	18	13	15	15
Spatial Relationship[ad]	10	11	17	14	12	12	13
Operational Knowledge							
Representation[b]	8	5	10	10	6	8	8
Classification[abd]	23	18	12	3	32	19	17
Numerical Relationship	5	5	7	7	4	5	7
Operational Knowledge[abd]	37	29	29	20	43	31	32

Note. Physical knowledge and operational knowledge are major content reference categories representing the sum of a speaker's moves that were coded under the subcategories they subsume.

[a]Significant main effect for Family Group.

[b]Significant main effect for Activity.

[c]Significant main effect for Parent Sex/Role.

[d]Significant interaction effect for Family Group X Activity.

Table 25

Mean Percentages of Children's References to Substantive Content for Family Groups, Activities, and Interactions with Their Mothers and Fathers

Substantive Meaning	Family Group NDG	NDB	DDB	Activity SSFP	SBST	Parent M	F
	Mean Percentages for Discourse Behavior						
Substantive Content References[b]	72	69	69	65	75	72	69
Specific Substantive Content Reference							
Socio-Emotional Knowledge							
Achievement	3	3	2	3	2	3	3
Physical Knowledge							
Object/Attribute	15	18	13	16	15	16	15
State-Object Relationship[bc]	11	12	17	16	11	13	13
Spatial Relationship[ac]	7	10	14	12	9	10	11
Operational Knowledge							
Representation	10	6	11	10	7	9	8
Classification[abc]	22	16	10	2	30	18	15
Operational Knowledge[abc]	36	27	26	19	41	30	29

Note. Socio-emotional knowledge, physical knowledge, and operational knowledge are major categories representing the sum of a speaker's moves that were coded under the subcategories they subsume.

[a]Significant main effect for Family Group.

[b]Significant main effect for Activity.

[c]Significant interaction effect for Family Group X Activity.

A summary table of the ANOVA results for the reliable categories of the Substantive Meanings facet are provided below in Table 26. A report of the significant results is presented after the table.

Table 26

Summary of Analyses of Variance for Substantive Meanings:

Family Group X Parent Sex/Role X Activity

(with repeated measures for Parent Sex/Role and Activity)

Substantive Meaning	Family Group (A)	Parent Sex/Role (B)	Activity (C)	AXB	AXC	BXC	AXBXC
			F Ratio for Discourse Behavior (df 2,1,1)				
P Substantive Content moves	2.64	5.41*	48.97***	1.74	4.22*	.03	.50
C Substantive Content moves	.47	1.10	22.51***	1.47	1.95	.01	.61
Specific Substantive Content Reference							
C Achievement	.60	.05	.93	1.09	1.27	.54	1.72
C Object/ Attributes	2.56	.21	.88	.62	2.57	.04	.23
P State-Obj. Relationships	7.99**	.004	11.90**	.30	11.07***	.13	.01
C State-Obj. Relationships	3.12	.01	7.70*	.47	5.51*	.53	.09
P Spatial Relationships	7.41**	.01	2.48	.25	9.13**	.02	.01
C Spatial Relationships	4.12*	.05	2.68	.70	4.98*	.24	.24
P Operational Knowledge	4.64*	.03	51.13***	.49	3.58*	.00	.55

C Operational Knowledge	6.03**	.33	63.89***	1.88	5.20*	1.00	.41
P Representation	2.68	.00	7.13*	.01	3.33	.004	.42
C Representation	2.02	.14	2.16	.06	3.19	.07	.48
P Classification	9.44**	.47	155.70***	.45	6.88**	.04	.39
C Classification	14.03***	2.34	177.45***	1.92	10.67***	.34	1.17
P Numerical Relationships	1.29	2.50	4.02	.29	3.46	.21	.36

Note. Only coding categories for which inter-rater reliability (r ≤ .70). has been established are included in this table. P = parents. C = children.
* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Substantive content references by parents.

The mean proportion for the sum of all references to substantive content by parents was not directly influenced by the Family Group factor; however, certain specific categories of substantive content references were influenced by the sex and/or developmental status of the children that parents were interacting with. The general category of state-object relationships. and the subcategory of references to the spatial relationships of objects, were referred to more frequently by the parents of DDB. Furthermore, as can be seen from Table 27, below, a significant interaction between the Family Group and Activity factors was related to the proportion of parent moves that referred to these two topics

Table 27

Mean Percentages for Parents' References to State-Object Relationships and Spatial Relationships during Educational Activities

Substantive Content Reference	SSFP Activity NDG	NDB	DDB	SBST Activity NDG	NDB	DDB
State-Object Relationships[a]	15%	19%	18%	10%	7%	22%
Spatial Relationships[b]	11%	15%	15%	9%	6%	20%

Note. References to specific spatial relationships were coded under that subcategory and then included as instances of references to the more general category of state-object relationships.
[a]Family Group X Activity $F = 11.07$, $p < .001$.
[b]Family Group X Activity $F = 9.13$, $p < .01$.

From the figures in the table above, it appears that during the SBST activity, the parents of NDG and NDB significantly decreased their references to state-object relationships in general and to the spatial relationships of objects in particular, while the parents of DDB increased their reliance on such references. The increase in these references by the parents of DDB are, on the basis of this author's observations, attributable to their frequently asking their children "where does it go", when they wanted their children to place a block correctly; and to these parents tendency to accompany their demonstrations of the task with comments such as "see, it goes there". Parents of NDG and NDB, on the other hand, tended to stress the classification criteria that were relevent to the block sorting task they were asking their children to perform, or that they were demonstrating to their children. During the SSFP activity, parents of both NDB and DDB referred to spatial relationships about equally and somewhat more frequently than the parents of NDG did.[1]

Parents' references to operational knowledge in general (i.e., the sum of references coded under the subcategories of causality, representation, classification, and numerical relationships), were more frequent when they were interacting with their daughters and less frequent, but about equal when they interacted with their sons, regardless of the developmental status of those sons. Specific references by parents to various aspects of classification followed a similar pattern. Parents of NDG referred to classification most frequently, parents of NDB referred to classification less frequently, while the parents of DDB referred to classification least frequently.

Parental references to operational knowledge in general, and to classification, in particular, were both influenced by an interaction between the family group and the activity

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[1] For the two NDC groups, an earlier run ANOVA indicated that this difference was significantly related to an interaction between the sex of the child that was being interacted with and the activity that was being engaged in (Child Sex X Activity $\underline{F} = 5.0$, $\underline{p} < .05$).

they were engaged in. As can be seen from Table 28, below, during the SBST activity all the parents increased their references to classification; therefore, their references to operational knowledge in general, also increased. More specifically, during the SBST activity the parents of NDG increased their references to these topics more than the parents of NDB who, nevertheless, increased their references a good deal. While the parents of DDB also increased their references to operational knowledge and classification during the SBST activity, they did so far less than the parents of NDG or NDB.

Table 28

Mean Percentages of Parents' References to Operational Knowledge and to Classification during Two Educational Activities

Substantive Content Reference	SSFP Activity NDG	SSFP Activity NDB	SSFP Activity DDB	SBST Activity NDG	SBST Activity NDB	SBST Activity DDB
Operational Knowledge[a]	20%	17%	23%	53%	42%	34%
Classification[b]	4%	3%	2%	43%	33%	21%

[a] Family Group X Activity $F = 3.58$, $p < .05$.
[b] Family Group X Activity $F = 6.88$, $p < .01$.

The sex/role of the parent was significantly related to the mean proportion of parent's total references to substantive content. Mothers, particularly those who interacted with NDC, referred to substantive content more than fathers did; however, none of the specific content categories were referred to significantly more by either parent.

Parents' mean proportion of references to substantive content were significantly influenced by the activity being engaged in and, more specifically, by an interaction between their family group and the activity. During the SBST activity all parents increased their use of references to substantive content; nevertheless, as can be seen from table 29 which follows, during the SSFP activity the parents of DDB emitted far more substantive content references than the parents of NDC or NDB did. During the SBST activity all of the parents devoted a similar proportion of their moves to references to substantive content in general, although as the previous table, Table 28, indicates the parents of DDB were not providing as many references to the topic which was most directly relevant to the task at hand (i.e., classification).

Table 29

Mean Percentages of Parents' References to Substantive Content during Educational Activities

Substantive Content Reference	SSFP Activity NDG	SSFP Activity NDB	SSFP Activity DDB	SBST Activity NDG	SBST Activity NDB	SBST Activity DDB
Substantive Content	70%	68%	78%	84%	81%	83%

Note. Family Group X Activity $F = 4.22$, $p < .05$.

During the SBST activity, all parents' made more references to operational knowledge, in general, and to classification, in particular; both of which were directly relevant to the block sorting task they were undertaking. Parents references to state-object relationships, on the other hand, decreased during the SBST activity.

As was mentioned previously the interaction between the Family Group and Activity factors was significantly related to the mean proportions of parents' references to state-object relationships and to spatial relationships (see Table 27). Although the pattern of behavior that resulted differed, this same interactive effect was also related to parents' use of references to operational knowledge and classification (see Table 28).

The SSFP activity had a significant influence on parents' references to representation (i.e., letters, pictures, models, etc.), with more parental references to representation occurring during that activity. A similar trend was evident for parents' references to numerical relationships (F = 4.02, p <.06). In addition, there was a trend for the interaction between Family group and Activity to be related to the mean proportions of parents' references to representation (F = 3.33, p <.06) and numerical relationships (F = 3.46, p <.06). The table below indicates the pattern of parental references to representation and numerical relationships for the different family groups and activities.

Table 30

Mean Percentages of Parents' References to Representation and Numerical Relationships during Educational Activities

Substantive Content Reference	SSFP Activity NDG	NDB	DDB	SBST Activity NDG	NDB	DDB
Representation	11%	5%	14%	6%	6%	6%
Numerical Relationships	6%	8%	6%	3%	3%	7%

<u>Substantive content references by children</u>.

Although children's total references to substantive content were not significantly influenced by their family group, their references to specific subcategories of substantive content were influenced by the Family Group factor. The mean proportion of children's references to spatial relationships, to various aspects of operational knowledge, and specifically to classification were related to their sex and/or developmental status (i.e., Family Group). Spatial relationships were referred to most frequently by the DDB and least frequently by the NDG. References by children to operational knowledge, in general, and to the subcategory of classification, in particular, were most frequently emitted by NDG.

The sex/role of the parent they were interacting with was not significantly related to the total proportion of moves children devoted to substantive content, or to any of their references to the specific substantive content subcategories.

The activity they were engaged in did have a significant influence on the proportion of children's moves which referred to substantive content in general, and on the proportion of moves they devoted to four of the eight specific subcategories of substantive content. During the S2ST activity children significantly increased their references to substantive content. The bulk of this increase is attributable to their significant increases in overall references to operational knowledge, but more specifically to their substantial increases in references to classification, the category which was most relevant to the block sorting task they were engaged in.

Children's references to state-object relationships were significantly influenced by the activity. These references decreased during the SBST activity. Furthermore, an interaction between children's family group and the activity they were engaged in was significantly related to children's references to state-object relationships, spatial relationships, operational knowledge, and classification. Table 31 below provides the mean percentages for children's references to those substantive content subcategories that were influenced by a Family Group by Activity interaction. The subcategory of representation is included in the table because there was a trend for the same interactive effect to be somewhat related to the proportion of children's references to that subcategory ($F = 3.19$, $p < .07$). As can be seen from Table 31, below, during the SSFP activity NDB emitted far fewer references to representation than DDB, and even considerably less of these references than NDG did. Largely because NDB were the least likely to select or maintain an interest in playing with the alphabet cards, or to name the letters embossed on the Disneyland blocks.

Table 31

Mean Percentages of Children's References to Substantive

Content Subcategories Influenced by a Family Group by Activity Interaction

Substantive Content Reference	SSFP Activity NDG	SSFP Activity NDB	SSFP Activity DDB	SBST Activity NDG	SBST Activity NDB	SBST Activity DDB
State-Object Relationships *	14%	13%	16%	9%	6%	18%
Spatial Relationships *	8%	14%	12%	7%	6%	15%
Operational Knowledge *	20%	16%	21%	52%	39%	31%
Classification **	3%	3%	2%	42%	30%	18%
Representation	11%	4%	14%	8%	7%	7%

* $p<.02$. ** $p<.001$.

Referring to the table above, it is clear that during the SBST activity the DDB relied most heavily on references to state-object relationships and especially on references to spatial relationships. During the SSFP activity all three groups referred to state-object relationships to a similar degree, although NDG did so least frequently. References to the subcategory of spatial relationships were even more infrequent for NDG during the SSFP activity.[1] Operational knowledge references by children increased considerably during the SBST activity. Particularly those references to the subcategory of classification. The DDB, for whom the

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[1] An earlier run ANOVA, comparing only the NDB with the NDG had indicated that there was a trend for a Child Sex by Activity interaction effect to occur ($F = 4.06$, $p < .07$).

block sorting task was the most difficult and whose language skills were deficient, did not increase their references to classification as much as the two groups of NDC did.

Substantive-Logical Meaning

As has been discussed previously, the substantive-logical facet categories were difficult to code reliably, especially for parents' behaviors. (See inter-rater reliability study results in this chapter for details.) Of the six categories, for the communicative functions of the discourse behavior that was observed, only one, parents' explaining moves, was found to be influenced by the Family Group factor. Four of the six categories were influenced by the activity being engaged in. Table 32 and Table 33 provide the mean percentages for the communicative functions of moves that referred to substantive content for parents and children, respectively.

Table 32

Mean Percentages of Mothers' and Fathers' Substantive-Logical Meanings for Family Groups, Activities, and Parents' Sex/Roles

Substantive-Logical Meaning	Family Group			Activity		Parent	
	NDG	NDB	DDB	SSFP	SBST	M	F
	Mean Percentages for Discourse Behavior						

Communicative Function							
Empirical Process Categories							
Explaining[ab]	2	3	1	2	3	3	2

[a]Significant main effect for Family Group.
[b]Significant main effect for Activity.

Table 33

Mean Percentages of Children's Substantive-Logical Meanings for Family Groups, Activities, and Interactions with Their Mothers and Fathers

Substantive-Logical Meaning	Family Group NDG	NDB	DDB	Activity SSFP	SBST	Parent M	F
	Mean Percentages for Discourse Behavior						
Substantive-Logical Moves[a]	36	36	32	29	39	35	33
Communicative Function							
Analytical Process Categories							
Defining and/or Interpreting	10	10	9	10	10	11	9
Empirical Process Categories							
Fact-stating	14	13	10	13	12	13	12
Empirical Process Moves[a]	24	24	21	18	28	23	23
SINFO[a]	34	34	31	28	37	34	32

Note. SINFO denotes providing or requesting substantive information (i.e., the sum of moves involving analytical and empirical processes).
[a]Significant main effect for Activity.

A summary of the results from the ANOVAS for the communicative functions of moves that referred to substantive content are provided in Table 34 below. A brief report of the significant results follows the table.

Table 34

Summary of Analyses of Variance for Substantive-Logical Meanings: Family Group X Parent Sex/Role X Activity (with repeated measures for Parent Sex/Role and Activity)

Substantive-Logical Meaning	Family Group (A)	Parent Sex/Role (B)	Activity (C)	AXB	AXC	BXC	AXB XC
			F Ratios for Discourse Behavior (*df* 2.1.1.20)				
C Substantive-Logical Moves	.76	.39	17.14***	.57	.46	.00	1.36
C Analytical Process moves	.1[illegible]	1.82	.04	.24	3.04	.64	.44
C Empirical Process moves	.34	.00	27.24***	.96	.53	.3[illegible]	1.01
C Fact-stating	2.00	.52	.02	1.29	1.30	.27	.68
P Explaining	7.93**	1.44	8.99**	.25	1.90	.02	.38
C Providing or Requesting Substantive Information	.40	.48	13.32**	.52	.39	.04	1.19

Note. Only coding categories for which inter-rater reliability ($r \leq .70$). has been established are included in this table. P = parents. C = children.
* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Parents' substantive-logical behaviors.

Explaining was the only communicative function which was reliably coded for parents when they referred to substantive content. Although none of the parents did a great deal of explaining, the parents of DDB explained significantly less often when interacting with their children than parents of NDG or NDB did, even though all of the parents explained slightly more to their children during the more highly structured and goal oriented block sorting activity than during the semi-structured free-play activity.

The sex/role of the parent had no significant influence on parents' use of explaining moves. Furthermore, none of the interaction effects tested were significantly related to the proportion of explaining moves parents emitted.

Children's substantive-logical behaviors.

The communicative functions of children's moves, when they referred to substantive content, were more reliably coded than their parents moves had been. Although the mean proportions for the various types of communicative functions children utilized did vary somewhat, family group differences were not significantly related to their use of any of substantive-logical behaiors. The sex/role of the parent they were interacting with also did not significantly influence children's use of specific communicative functions.

The activity they were engaged in did have a significant impact on three of the five types of communicative functions analyzed for children. The mean proportions for moves by children which involved substantive-logical behaviors (i.e., the sum of all moves involving communicative function related to substantive content), and for moves which provided or requested substantive information (SINFO), increased sharply during the SBST activity. Not surprisingly, these increases were mostly due to a significant increase in the proportion of children's moves that involved empirical processes (i.e., the sum of fact-stating, nonverbally demonstrating, verbally demonstrating, and explaining moves).

Neither the sex/role of parents nor any of the interactions tested had a significant influence on children's substantive-logical behaviors.

Instructional Meaning

Both parents and their children referred to instructional content somewhat more frequently than to substantive content. The majority of these references focused on specific actions or procedures that were relevant for the activities being engaged in. Table 35 and Table 36 provide the mean percentages of references to instructional content by parents and their children, respectively.

Table 35

Mean Percentages of Mothers' and Fathers' References to Instructional Content for Family Groups, Activities, and Parents' Sex/Roles

Instructional Meaning	Family Group NDG	NDB	DDB	Activity SSFP	SBST	Parent M	F
	Mean Percentages for Discourse Behavior						
Instructional Content References[b]	81	81	80	84	77	80	81
Specific Instructional Content Reference							
Action and/or Procedure[c]	51	55	55	52	55	54	53
Cognitive Action	3	5	4	4	5	5	3
Statement[ac]	16	15	10	14	13	13	14
Repeated Statement[b]	3	2	3	3	2	3	3
Expanded Statement[ab]	.4	.7	1	1	.5	.8	.7
Altered Statement	.8	.8	2	1	1	1	1

[a]Significant main effect for Family Group.
[b]Significant main effect for Activity.
[c]Significant interaction effect for Family Group X Activity.

Table 36

Mean Percentages of Children's References to Instructional Content for Family Groups, Activities, and Interactions with Their Mothers Fathers

Instructional Meaning	Family Group NDG	NDP	DDB	Activity SSFP	SBST	Parent M	F
	Mean Percentages for Discourse Behavior						
Instructional Content References[b]	74	76	70	77	70	70	75
Specific Instructional Content Reference							
Action and/or Procedure[d]	48	52	46	48	49	48	49
Repeated Statement[a]	2	2	7	3	3	3	3
Person[bc]	.6	.4	.6	.7	.3	.8	.3

[a]Significant main effect for Family Group.
[b]Significant main effect for Activity.
[c]Significant main effect for Parent Sex/Role.
[d]Significant interaction effect for Family Group X Activity.

A summary table of the ANOVA results for the reliable categories of the instructional meaning facet are provided in Table 37. A report of the significant results is presented after the table.

Table 37

Summary of Analyses of Variance for Instructional Meaning: Family Group X Parent Sex/Role X Activity (with repeated measures for Parent Sex/Role and Activity)

Instructional Meaning	Family Group (A)	Parent Sex/Role (B)	Activity (C)	AXB	AXC	BXC	AXBXC
	F Ratio for Discourse Behavior (*df* 2,1,1,20)						

P Instructional Content moves	.16	.42	15.65***	.04	1.16	.16	.32
C Instructional Content moves	1.47	1.59	6.88*	.07	2.26	.00	1.57
Specific Instructional Content References							
P Action and/or Procedure	1.37	.07	1.30	.67	5.50*	.19	.34
C Action and/or Procedure	1.95	.48	.01	.30	4.69*	.40	1.04
P Cognitive Action	.79	3.78	.26	.72	.25	.00	1.23
P Statement	17.31***	.87	.86	1.24	4.93*	.49	.40
P Repeated Statement	.79	.14	6.49*	.13	1.58	2.58	2.27
C Repeated Statement	23.30***	.03	.01	.16	1.08	2.56	2.35
P Expanded Statement	4.62*	.21	13.89**	1.26	2.67	1.37	.09
P Altered Statement	3.27	.48	2.55	.77	1.10	.86	1.32
C Person	.56	5.85*	5.12*	.48	1.08	.19	.62

Note. Only coding categories for which inter-rater reliability has been established ($r \leq .70$), are included in this table. P = parents. C = children.
* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Instructional content references by parents.

Seven categories for references to instructional content were analyzed for parents. Of these only two were influenced by the sex and/or developmental status of the children being interacted with (i.e., Family Group). Parents of DDB referred to the truth and propriety of statements less frequently than parents of NDG or NDB. The mean proportions for such references by the parents of both NDC groups were about the same.

In general, expansions of their children's statements by parents were rarely uttered; however, the parents of NDG engaged in this behavior least frequently. Of the two groups of parents interacting with their sons, the parents of DDB expanded their children's statements most frequently, while the parents of NDB did so somewhat less often. Since it has been suggested that expansions allow parents to provide additional substantive information as well as language models for their children (Brown & Bellugi, 1964) these results may be related to parents' perceptions of the level of cognitive and language skills that their children possess.

The sex/role of the parent was not significantly related to the proportion of parental references to any of the specific instructional content categories, nor to their proportion of references to instructional content in general; however, there was a trend for mothers to refer to cognitive actions more frequently than fathers did (F = 3.78, p <.07), The activity being engaged in was related to the overall proportion of references to instructional content of any sort and particularly to parents' use of the techniques of repeating or expanding their children's statements.[1] During the SSFP activity all parents referred to instructional content more frequently and they repeated and expanded more of their children's statements. As can be seen from Table 38, below, the Family Group and Activity factors had a significant interactive effect on the mean proportion of parents' references to the truth and/or propriety of statements and on their references to actions and/or procedures.

Table 38

Mean Percentages of Parents' References to Statement and Action and/or Procedure during Educational Activities

Instructional Content Reference	SSFP Activity NDG	SSFP Activity NDB	SSFP Activity DDB	SBST Activity NDG	SBST Activity NDB	SBST Activity DDB
Truth & Propriety of Statement	16%	14%	13%	17%	16%	8%
Action and/or	52%	58%	48%	51%	53%	62%

[1] A category for coding all references to statements was included in the inter-rater reliability study. The subcategories for repeated statements, expanded statements, and altered statements were coded at a later date (see section on "Coding the Data" in Chapter 4, "Methods and Procedures". These subcategories were added to measure behaviors by parents which have been considered as possible language "teaching" strategies (Brown, 1973; Cazden, 1972; Gleason & Weintraub, 1979).

Procedure

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Note. Family Group X Activity interaction term for truth & propriety of statements $F = 4.93$, $p < .02$; for action and/or procedure $F = 5.50$, $p < .02$.

Although the parents of DDB generally referred to the truth and propriety of statements less frequently than the parents of NDG or NDB, they did so particularly during the SBST activity. During the SBST activity parents of NDG and NDB decreased their references to action and/or procedure somewhat, while parents of DDB increased their references considerably. In large measure this is due to the fact that during the SBST activity the parents of DDB relied heavily on ordering their children to perform the task, and/or prohibiting noncompliant behavior.

Although references to person by parents were only tenuously reliably coded, the statistical results for this behavioral variable seem to confirm the qualitative differences that were observed between family groups. Parents of DDB referred to person more frequently (M = 2%) than parents of either NDG (M = 1%) or NDB (M = 1%). A significant main effect for Family Group was indicated (F = 4.52, $p < .03$). This author's observations and subsequent comments by the coders indicated that when parents of DDB were coded as referring to person, they were generally reacting to their children's actions in a personalized and evaluatory manner (e.g., "good boy", "you're being bratty", "bad boy", "silly", etc.)[1] Parents interacting with NDC rarely used personalized evaluations and instead evaluated their children's actions directly (e.g., "that's right", "great", "no, that's not the way it goes". etc.). Coded references to persons by parents of NDG or NDB usually involved informational comments about somebody (e.g., "she doesn't live here", "I don't know why they are laughing", etc.).

Instructional references by children.

Of the four instructional content reference categories that were analyzed for children's behaviors, only the proportion of children's repetitions of their parents' statements was related to their sex and/or developmental status (i.e., Family Group). Children who were developmentally delayed repeated their parents' statements much more frequently than either of the NDC groups. A finding which supports Nelson's hypothesis (1973) that spontaneous imitation is a strategy utilized by children who are relatively delayed in language acquisition.

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[1] It seems very likely that this category was not reliably coded because personalized evaluations represent a confounding of explicit references to the person doing the action with an implicit reference to the action. For example, "good boy" should be coded as person but, since it also functioned to inform the child that the action was correct, coders may have coded such comments as evaluations of action and/or procedure.

The sex/role of the parent being interacted with did influence the proportion of children's references to person. Although such references were infrequent. more of them were addressed to mothers than to fathers.

Children's references to instructional content, in general, and about persons, in particular, were influenced by the activity being engaged in. The mean proportions for these references by children decreased during the SBST activity, when they had to attend to specific substantive content.

As can be seen from Table 39. below, children's references to actions and/or procedures were influenced by the interaction between their sex and/or developmental status and the activity they were engaged in. During the SSFP activity NDB emitted a higher proportion of references to actions and/or procedures than NDG, and a much higher proportion than DDB. During the SBST activity, while NDG and NDB decreased their proportions of these references, DDB increased their references to actions and/or procedures and emitted a higher proportion than either the NDG or NDB did. This probably reflects DDB's tendency to talk about where they should place the blocks on the board (e.g., Goes there?) instead of emphasizing the distinctive classification attributes that were relevant to the task (e.g., These are both O's)

Table 39

Mean Percentages of Children's References to Action and/or Procedures during Two Educational Activities

Family Group	SSFP Activity	SBST Activity
NDG	49%	46%
NDB	56%	48%
DDB	40%	52%

Note. Family Group X Activity $F = 4.69$, $p < .05$.

Instructional-Logical Meaning

The categories from the instructional-logical meaning facet were used to code the communicative functions associated with instructional content and were for the most part, the same as the substantive-logical meaning categories. Like the analagous substantive-logical meaning categories, many of the instructional-logical meaning categories had not been reliably coded for parents or for children.

A total of 16 reliably coded communicative functions associated with instructional content references were analyzed. Of these seven were significantly influenced by the Family Group factor, five were significantly influenced by the sex/role of the parent, five were influenced by the activity being engaged in, and two were influenced by the interaction between Family Group and Activity. Table 40 and Table 41 provide the mean percentages for the communicative functions of moves that referred to instructional content for parents and children, respectively.

Table 40

Mean Percentages of Mothers' and Fathers' Instructional-Logical Meanings for Family Groups, Activities, and Parents' Sex/Roles

Instructional-Logical Meaning	Family Group NDG	NDB	DDB	Activity SSFP	SBST	Parent M	F
	Mean Percentages for Discourse Behavior						
Communicative Function							
Evaluatory Process Categories							
Evaluatory Process Moves[ac]	42	40	35	40	38	38	41
Opining[bc]	17	15	13	18	12	14	16
Rating[b]	25	25	22	22	26	24	24
Positive Rating	19	20	15	17	19	18	17
RATE POS[a]	76	79	62	74	70	75	70
Negative Rating[ab]	5	4	7	4	6	5	6
RATE NEG[a]	21	17	33	21	26	23	25

Note. RATE POS = Positive Ratings/Ratings. RATE NEG = Negative Ratings/Ratings.
[a]Significant main effect for Family Group.
[b]Significant main effect for Activity.

[c]Significant main effect for Parent Sex/Role.

Table 41

Mean Percentages of Children's Instructional-Logical Meanings for Family Groups, Activities, and Interactions with Their Mothers and Fathers

Instructional-Logical Meaning	Family Group NDG	NDB	DDB	Activity SSFP	SBST	Parent M	F
	Mean Percentages for Discourse Behavior						
Communicative Function							
Empirical Process Categories							
Empirical Process Moves[abd]	22	24	13	24	15	19	20
Evaluatory Process Categories							
Evaluatory Process Moves[c]	32	30	28	31	29	28	32
Opining[c]	5	6	5	5	5	4	7
Rating	25	23	22	24	22	22	24
Positive Rating[cd]	18	18	16	19	16	16	19
Composite variable							
INFO[a]	62	65	49	59	58	58	59

Note. INFO = represents the proportion of all moves, by a speaker, that were coded as analytical or empirical process moves.

[a]Significant main effect for Family Group.
[b]Significant main effect for Activity.
[c]Significant main effect for Parent Sex/Role.
[d]Significant interaction effect for Family Group X Activity.

A summary of the results from the ANOVAS for the communicative function of moves with instructional meaning are provided in Table 42. A brief report of the significant results follows that table.

Table 42

Sumary of Analyses of Variance for Instructional-Logical Meanings: Family Group X Parent Sex/Role X Activity (with repeated measures for Parent Sex/Role and Activity)

Instructional-Logical Meaning	Family Group (A)	Parent Sex/Role (B)	Activity (C)	AXB	AXC	BXC	AXB XC
F Ratios for Discourse Behavior (df 2,1,1,20)							
C Empirical Process	5.43*	.03	49.25***	.01	6.51**	.82	.94
P Evaluatory Process	6.96**	4.98*	1.81	.04	1.13	.23	1.10
C Evaluatory Process	.51	11.90**	1.31	.22	1.62	2.10	1.83
P Opining	2.05	6.04*	19.73***	.58	1.01	.14	1.12
C Opining	.66	5.16*	.00	.06	.22	3.93	.90
P Rating	1.11	.11	4.65*	.34	.54	1.53	1.95
C Rating	.41	3.16	2.45	.33	1.76	.04	1.97
P Positive Rating	2.47	.14	2.03	.20	.33	.89	1.03
C Positive Rating	.19	5.65*	3.99	.68	4.36*	.57	3.31
P RATE POS	3.66*	2.31	2.35	.76	1.18	.46	.26
P Negative	3.63*	1.02	6.51*	.27	.65	.11	.52

Rating							
P RATE NEG	5.34*	.33	2.82	.28	.18	.08	.35
C INFO	5.02*	.04	.19	.44	.61	.00	.48

Note. Only coding categories for which inter-rater reliability has been established ($r \leq .70$), are included in this table. P = parents. C = children.

RATE POS = proportion of rating moves that were positive ratings.

RATE NEG = proportionof rating moves that were negative ratings.

INFO = requesting or providing information (regardless of type of content).

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Parent's instructional-logical behaviors.

Although there was no significant relationship between the family group assignment and the proportion of moves parents' devoted to offering opinions about instructional content (i.e., opining) and to rating, the total proportion of parent moves involving evaluatory processes (i.e., the sum of opining and rating moves) was significantly influenced by the Family Group factor. Parent of DDB provided instructionally oriented evaluations less frequently than parents of NDG or NDB did; nevertheless, they emitted a higher proportion of negative ratings to their children. Comparing the specific aspects of rating behaviors by the three groups of parents indicated that, of the rating moves emitted by parents of DDB, a lower proportion were devoted to positive ratings (RATE POS) and therefore a higher proportion were devoted to negative their interactions. During the SBST activity all parents decreased the proportion of their instructionally oriented opining moves.

The rating behavior of parents was also related to the activity being engaged in. Ratings by parents, in general, increased significantly during the SBST activity. While parents were teaching the block sorting task their increase in positive ratings was not significant ($F = 2.47$, $p < .12$); however, their increase in negative ratings was.

None of the interactions tested significantly influenced any of the reliable parent behaviors coded under the instructional-logical meaning facet.

Children's instructional-logical behaviors.

The sex and/or developmental status of the children (i.e., their Family Group) influenced the mean proportion of their moves that involved empirical processes (i.e., the sum of moves referring to instructional content by fact-stating, nonverbally demonstrating, verbally demonstrating, and explaining). As was to be expected. boys who were developmentally delayed emitted less empirical process moves than boys or girls who were developing normally. The DDB also emitted a significantly lower proportion of those moves ratings (RATE NEG).[1]

The sex/role of the parents was related to the overall proportion of instructionally oriented evaluatory process moves (i.e., the sum of opining and rating moves) that parents emitted, and more specifically to their use of opining moves. Fathers generally emitted a significantly higher proportion of evaluatory process moves and in particular devoted significantly more of their moves to offering opinions about instructional aspects than mothers did. Fathers also emitted a somewhat higher mean proportion of negative ratings, a parent sex/role difference which Clark-Stewart (1978a) noted during her observations of father/toddler interactions. Although the parent sex/role difference for negative ratings was not significant, it probably did contribute to the significant difference that was revealed for evaluatory process moves by fathers versus mothers.

The activity that parent/child dyads were engaged in influenced the proportion of moves that the parents devoted to offering opinions about the instructional aspects of

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[1] The proportion of positive rating moves which were combined with substantive-logical meaningt was significantly less for parents of DDB (P/NDG M =6%; P/NDB M =6%; P/DDB M =4%; F = 3.93, p <.05. Unfortuanately, since substantive-logical meaning was only tenuously reliable, this composite category can not be included with the results reported here. As a behavioral difference, however, it has important implications for understanding parents' teaching strategies.

that involved providing or requesting information, without regard to the content being referred to (INFO).

The sex/role of the parent they were interacting with had an impact on some of the instructional-logical behaviors children emitted. All the children addressed a higher mean proportion of evaluatory process (i.e., the sum of opining and rating moves) to their fathers than to their mothers. More specifically, they offered their fathers significantly more opinions about the instructional aspects of their interactions and they offerred significantly more positive ratings.

The activity they were engaged in influenced the mean proportion of empirical process moves (i.e., the sum of fact-stating, nonverbally demonstrating, verbally demonstrating, and explaining) that children emitted. During the SBST activity all of the children emitted a lower proportion of moves involving empirical processes that referred to instructional content.

Children's proportions of empirical process moves and their positive rating moves were both influenced by a significant interaction effect between Family Group and Activity. The mean percentages for the empirical process moves and the positive rating moves are provided in table 43, below.

Table 43

Mean Percentages of Empirical Process and Rating Moves by Children during Two Educational Activities

Instructional Logical Meaning	SSFP Activity NDG	SSFP Activity NDB	SSFP Activity DDB	SBST Activity NDG	SBST Activity NDB	SBST Activity DDB
Empirical Process **	26%	31%	15%	18%	16%	11%
Positive Rating *	22%	16%	18%	15%	19%	15%

Note. Family Group X Activity interaction term for Empirical Processes F = 6.5; for Positive Ratings F = 4.4.
* p .03. ** p .01.

Although all of the children decreased their proportion of empirical process moves during the SBST activity, the decrease by the NDB was far more dramatic than the decrease by DDB and almost twice as much as the decrease by NDG.

The proportion of positive rating moves emitted by children was influenced in a somewhat more complex manner, as was reflected by a trend indicating a relationship between these moves and a three-way interaction between Family Group, Parent Sex/Role, and Activity.

Table 44

Mean Percentages for Positive Ratings by Children during

Educational Activities with Each Parent

Family Group	SSFP Activity		SBST Activity	
	mother	father	mother	father
NDG	21%	23%	15%	15%
NDB	16%	16%	14%	24%
DDB	15%	21%	13%	16%

Note. Although this three-way interaction effect did not obtain an acceptable level of significance (F = 3.31, p <.06), this trend does indicate that the significant interaction between Family Group and Activity was more complex than the figures in table 43 could reveal.

As can be seen from Table 44 above, during the SBST activity, and particularly during the SSFP activity, DDB addressed more positive ratings moves to their fathers than to their mothers. During the SSFP activity neither the NDG nor the NDB seemed influenced by their parents' sex/role. However, during the SBST activity NDG decreased their positive ratings somewhat, but continued to provide approximately equal proportions of these moves regardless of the parent they were interacting with. In contrast, the NDB substantially increased the proportion of positive rating moves that they addressed to their fathers during the SBST activity.

It is possible that DDB particularly enjoyed acti[illegible] with their fathers during a less cognitively oriented activity

(SSFP) while NDB particularly enjoyed interacting with their fathers during the more cognitively challenging activity (i.e., SBST). If this is so, then that could account for these differences in positive ratings by NDB and DDB during the two activities.

Extra-Logical Meaning

Extra-logical meaning categories permitted the coding of certain communicative functions which were associated with instructional content, but which were not overtly directed at imparting information or providing evaluations. Most of these extra-logical process moves were concerned with directing behavior (i.e., initiatory extra-logical moves) or with response to such directives (i.e., reactive extra-logical moves). The subcategories which were summed to obtain the proportions of moves that were coded as initiatory extra-logical moves were: (1) prescribing a performance, (2) prohibiting a performance, (3) orders (a composite of the two previous categories), (4) soliciting a directive, (5) soliciting a repetition, (6) providing an alternative, and (7) requesting permission. Subcategories summed to determine the proportions of moves coded as reactive extra-logical moves were: (1) compliance, (2) noncompliance, (3) permitting a performance, (4) joking, and (5) word play. Most of these subcategories were not analyzed separately for the inter-rater reliability study nor for the results being reported here however, two additional variables labeled "co-operative"[1] and "noncooperative" behavior were analyzed. These variables represented the ratio of either one participant's compliance, or noncompliance moves, to the orders moves of the other participant (e.g., if a child emitted six noncompliance moves when interacting with a mother who issued 12 orders, then that child had a 1:2 ratio of non-cooperative behavior. and the child had been uncooperative 50% of the time).

Tables 45 and 46 provide the mean percentages for those parent and children moves, respectively, that were devoted to extra-logical communicative functions.

Table 45

Mean Percentages of Mothers' and Fathers' Extra-Logical Meanings for Family Groups, Activities, and Parents' Sex/Roles

Extra-Logical Meaning	Family Group NDG	NDB	DDB	Activity SSFP	SBST	Parent M	F
	Mean Percentages for Discourse Behavior						
Extra-Logical Moves[ac]	18	16	27	19	21	20	20

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[1] Compliance moves by children were only reliably coded and therefore, the category for cooperative behavior by children can not be considered reliable.

Communicative Function							
Initiatory Move[ab]	14	13	24	15	19	17	17
Orders[ab]	12	11	22	12	16	16	15

Note. Orders represents the proportion of all moves, by parents that were coded as either prescribing or prohibiting a performance.

[a]Significant main effect for Family Group.

[b]Significant main effect for Activity.

[c]Significant interaction effect for Family Group X Activity.

Table 46

Mean Percentages of Children's Extra-Logical Meanings for Family Groups, Activities, and Interactions with Their Mothers and Fathers

Extra-Logical Meaning	Family Group NDG	NDB	DDB	Activity SSFP	SBST	Parent M	F
	Mean Percentages for Discourse Behavior						
Extra-Logical Moves[ab]	20	20	26	19	25	23	21
Communicative Function							
Reactive Moves[ab]	12	12	20	10	19	16	13
Noncompliance[abc]	.7	.2	5	.8	3.1	2.5	1.4
Noncooperative[abc]	4	2	12	4	8	7	5

Note. Noncooperative = the proportion of noncompliance moves by children, to orders moves by parents.

[a]Significant main effect for Family Group.

[b]Significant main effect for Activity.

[c]Significant interaction effect for Family Group X Activity.

A summary of the results from the ANOVAS for the communicative functions of moves with extra-logical meaning are provided in table 47. A brief report of the significant results follows that table.

Table 47

Summary of Analyses of Variance for Extra-Logical Meanings:

Family Group X Parent Sex/Role X Activity

(with repeated measures for Parent Sex/Role and Activity)

Extra-Logical Meaning	Family Group (A)	Parent Sex/Role (B)	Activity (C)	AXB	AXC	BXC	AXBXC
F Ratios for Discourse Behavior (df 2,1,1,20)							
P Extra-Logical Moves	18.45***	.00	2.57	.04	5.30*	.98	.11
C Extra-Logical Moves	5.15*	.83	8.86**	.00	.65	.31	.66
P Initiatory Moves	21.84***	.00	11.97**	.02	2.80	1.58	.01
P Orders	20.36***	.22	25.42***	.02	2.86	.95	.29
C Reactive Moves	6.73**	3.45	20.27***	.05	.04	.82	.53
C Noncompliance	4.73*	.77	6.59*	.98	4.88*	.11	.58
C Noncooperative	3.57*	.41	4.61*	.76	4.16*	.79	.68

Note. Only coding categories for which inter-rater reliability has been established ($r \geq .70$), are included in the table. P = parents. C = children. Orders = all moves coded as prescribing, or prohibiting a performance.

Noncooperative = proportion of noncompliance moves by child, to Orders moves by parent.
* $p \leq .05$. ** $p \leq .01$. ** $p \leq .001$.

Parents' extra-logical behaviors.

In comparison to the two groups of parents who interacted with their NDC, the parents of DDB emitted a significantly higher mean proportion of moves coded as communicating extra-logical meanings, and particularly those involving initiatory processes. More specifically, the parents of DDB emitted a significantly higher proportion of moves that involved ordering their children to perform a prescribed action and/or prohibiting their children from engaging in an action (i.e., orders moves). Although parents of NDG did emit slightly more extra-logical process moves, more initiatory extra-logical moves, and more orders moves than parents of NDB, family group differences between parents of NDB and NDG were minimal.

In addition to the significant main effect for Family Group, which reflected the overall higher proportion of extra-logical process moves by parents of DDB, there was also a significant interaction between Family Group and Activity. As can be seen from Table 48, the parents of DDB emitted a substantially higher proportion of extra-logical process moves during the prescribed SBST activity than parents of NDG or NDB had.

Table 48

Mean Percentages of Parents' Extra-Logical Process Moves during Two Educational Activities

Family Group	SSFP Activity	SBST Activity
NDG	18%	18%
NDB	17%	16%
DDB	23%	30%

Note. Family Group X Activity interaction term $F = 5.30$, $p < .02$.

The sex/role of parents was not significantly related to any of their extra-logical behaviors.

The activity being engaged in significantly influenced the overall proportion of initiatory extra-logical moves emitted by parents, as well as their proportion of Orders moves. During the SBST activity all three groups of parents increased the proportions of these two types of moves.

Children's extra-logical behaviors.

Children's use of extra-logical process moves (i.e., the sum of their initiatory and reactive extra-logical process moves), was influenced by their family group characteristics. In comparison to both groups of NDC, the proportion of extra-logical process moves by DDB was significantly higher, largely because DDB emitted significantly more reactive extra-logical process moves. Main effects for Family Group and for Activity, as well as the interaction effect for Family Group by Activity, were significantly related to children's noncompliant behavior and to their lack of cooperation (i.e., noncooperative behavior). Table 49 indicates the mean percentages of children's noncompliance moves and of their noncooperative behavior. In order to further clarify these results, this table also includes the figures for children's compliance moves and for their cooperative behavior, as well as the percentages for parents' orders moves.

Table 49

Mean Percentages of Children's Extra-Logical Moves for Different Family Groups and Activities

Children's Extra-Logical Behaviors	SSFP Activity Family Group NDG	NDB	DDB	SBST Activity Family Group NDG	NDB	DDB
Compliance[t]	6%	6%	11%	13%	14%	15%
Noncompliance*	.3%	.3%	.8%	1%	.1%	3%
Cooperative[t]**	48%	39%	48%	57%	68%	39%
Noncooperative*	2%	3%	6%	6%	.3%	17%
Parents' Orders	10%	10%	17%	15%	13%	27%

Note. Noncooperative behavior = the ratio of children's noncompliance moves to parents' orders moves. Cooperative behavior = the ratio of children's compliance moves to

parents' orders moves. Variables for which Family Group X Activity interaction term was significant are starred.
[t]tenuously reliable category.
* $p < .05$. ** $p < .01$.

It is clear from Table 49 that the significant main effect for Family Group, and for Activity, as well as the significant interaction effect for these two factors, reflect the higher proportion of noncompliant and noncooperative behavior exhibited by DDB, particularly during the SBST activity. It is important to note, however, that these same children also exhibited a higher proportion of compliance moves and that during the SSFP activity they were as cooperative as the NDG and more cooperative than the NDB.

The significantly higher proportion of orders that parents addressed to their DDB must also be considered before any interpretations of the uncooperative behavior of DDB is undertaken. Clearly if parents were prescribing and prohibiting the actions of their DDB more frequently, then the opportunity for noncompliance increased and may not solely reflect these children's unwillingness to participate or cooperate. By the same token it must be recognized that parents of DDB frequently had to repeat their orders before compliance was actually obtained (for further discussion see chapter 5).

There were no indications that the sex/role of the parent they were interacting with was significantly related to children's extra-logical behaviors.

The activity being engaged in had a significant impact on all four of the reliable extra-logical behaviors that were analyzed. As was noted above, noncompliance and noncooperative behaviors increased during the SBST activity. During the SBST activity, while their parents utilized more initiatory extra-logical moves, children reciprocated by significantly increasing the proportions of their reactive extra-logical moves. As a result of this increase, the overall mean proportions of children's extra-logical process moves (i.e., the sum of their initiatory and reactive moves) also increased significantly.

Summaries of the results for discourse behaviors by parents and children, and the relationship of these results to the hypotheses of this study are provided in table form in Appendix H. A separate table is provided for each of the following six facets: (1) Pedagogical Move Types, (2) Substantive Meanings, (3) Substantive-Logical Meanings, (4) Instructional Meanings, (5) Instructional-Logical Meanings, and (6) Extra-Logical Meanings.

EDUCATIONAL TRANSACTIONS

Overview of Educational Transaction Results

The 26,295 moves which had been coded were condensed into 10,366 educational transactions (ETs). The mean number of moves per ET was 2.54 and the mean number of words per ET was 11.78. The total number of moves which had been coded during the two educationally oriented activities was 25,106. Parsing these moves into content oriented educational transaction sequences had resulted in a total of 9,843 ETs. Most of the results that will be reported in this section of this chapter are based on those transactions.

Having developed the construct of educational transactions, rather than pursuing the original intent of this study and analyzing teaching cycles (TC), it was important to determine whether or not educational transactions had provided a different perspective than teaching cycles would have provided. Teaching cycles were parsed in terms of the linguistic forms of pedagogical moves. A structuring move, or a soliciting move that was not preceded by a structuring move, initiate a new TC. Educational transactions, on the other hand, were parsed on the basis of content shifts.

In order to compare the results of these two approaches to parsing sequential moves, the linguistic forms of the pedagogical moves that the initiated each ET were tallied.

Out of the total 10,366 ETs that had occurred, 1,272, or 12.3% were initiated by structuring moves. Educational transactions that were initiated by soliciting moves totaled 4,014, or 38.17%.[1] Responding moves initiated 1,046, or 10.1% of the ETs, and reacting moves initiated 3,998, or 38.6% of the ETs. Another 36 (4%) of the ETs were initiated by pedagogical moves whose linguistic form was unclear.

These results indicate that almost half of the ETs (those initiated by responding or reacting moves) would have been parsed differently had the teaching cycles system been used. Based on these figures, it seems safe to assume that the perspective afforded by parsing moves in terms of content shifts (ETs), rather than in terms of the linguistic form of the initiatory pedagogical move (TC), does indeed provide a different vantage point.

The educational transaction data was analyzed from two different perspectives. First, in order to be able to describe and compare the transactions that had taken place between dyads across family groups, all of the moves within the ETs, regardless of speaker, were included in the analyses. When percentages of ET types were calculated the denominator was comprised of the total number of ETs that

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[1] Bellack et al. (1966) reported a total of 4,592 TCs with 18.2% initiated by structuring moves, 79.2% initiated by soliciting moves, and 2.5% partially inaudible and therefore not codable.

had occurred during the two educationally oriented activities. When ratios were calculated to determine content orientations, all of the moves that occurred during each of the ETs were included. This procedure provided a global view of how these transactions had transpired.

The second approach that was utilized in analyzing this data addressed itself to the behavioral contributions of the individual members of the dyads, and was undertaken so that the participatory behavior of the different parent groups, and of the different groups of children, could be described and compared. When the behavior of parents was being analyzed only those ETs that parents had participated in were included (parent ETs). When the behaviors of children were being analyzed only those ETs that they had participated in were included (child ETs). When the percentages of ET types were calculated the denominator consisted of _either_ the number of ETs that parents, or their children, had participated in. In calculating the ratios for determining parents', or children's, ET content orientations, only the moves of the parents, or their children, were included.

Table 50 below indicated the total number of ETs, as well as the number of parent and child ETs that occurred during the semi-structured free-play (SSFP) activity and the structured block sorting task (SBST) activity.

Table 50

Frequencies of Educational Transaction during Two

Educational Activities

Educational Transactions	Family Groups NDG	NDB	DDB	ALL
Total # of ETs	3,175	2,934	3,734	9,843
ETs parents participated in (Parent ETs)	2,633	2,438	3,087	8,158
ETs children participated in (Child ETs)	2,241	2,100	2,561	6,902

Note. NDG = families with normally developing girls (*n* =8). NDB= families with normally developing boys (*n* =8). DDB= families with developmentally delayed boys (*n* =7).

The duration and interactive quality of educational transactions.

In an effort to assess the duration of the ETs, the number of moves per ET that had occurred during the entire session were counted. Educational transactions, since they were determined by content shifts, could consist of any number of moves. The number of moves per ET ranged from 1 to 46. As can be seen from Table 51, below, slightly more than two fifths of the ETs consisted of only one move, while slightly less than two fifths of the ETs consisted of two to three moves. Less than one fifth of the ETs consisted of four to 7 moves and ETs consisting of eight or more moves were relatively infrequent.[1]

Table 51

Frequencies and Percentages of Educational Transactions of Varying Durations.

Duration of ETs	f	%
ETs consisting of 1 move	4,302	41.5
ETs consisting of 2 to 3 moves	3,977	38.4
ETs consisting of 4 to 7 moves	1,673	16.1
ETs consisting of 8 or more moves	414	4.0

Given the data summarized in Table 50 and 51, a computer program was developed for determining the duration and interactive quality of the ETs.[2] The interactive quality of ETs was determined by who participated in each ET. Two categories were used to indicate whether or not both participants had overtly interacted. The first category was labeled _input ET_. Input ETs were defined as ETS consisting

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[1] Both Neujahr (1976) and Resnick (1970) had analyzed sequences of moves and compared "brief" (8 moves or less) to "extended" (9 moves or more) interactions. The data from this study seems to indicate that their operational definition of "brief" interactions may be t broad.

of one or more moves, emitted by only one speaker (i.e., monologue behavior). There were a total of 4,891 input ETs. Since 4,302 ETs had been one move input ETS, there must have been an additional 589 input ETs which consisted of more than one move by one speaker. As can be seen on Table 52, which follows, parents offered more inputs than children did. The second interactive category was labeled *dyadic interaction ET* and was defined as an ET involving verbal and/or nonverbal moves by both members of the dyad. While slightly less than half of the ETs were classified as input ETs, slightly more than half were classified as dyadic interaction ETs.

Table 52

Frequencies and Percentages of Educational Transactions Classified as Inputs or Dyadic Interactions

ET Interaction Classification	f	%
Total Input ETs	4,891	47%
Parent Input ETs	3,123	30%
Children Input ETs	1,768	17%
Dyadic Interaction ETs	5,475	53%

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[2] This program was developed by Jack Davis, technical coordinator at the Center for Social Inquiry, University of Connecticut at Storrs.

In order to establish a framework for describing and comparing the ETs that had occurred when parent/child dyads interacted, the duration of their dyadic interaction ETs were further classified as brief, moderate, or sustained. As can be seen in Table 53, which follows, the majority of the dyadic interactions that parent/child dyads engaged in were brief ETs, i.e., consisted of two or three moves. These were engaged in about twice as often as the somewhat longer moderate ETs, which consisted of four to seven moves. Sustained ETs, lasting for eight or more moves, were not engaged in very often. (See Table 4 in the definitions section in chapter 2 for examples of types of ETs). However, as Dolley (1974) indicated, it may be these rarely occurring but semantically and sytactically complex transaction which are crucial when differentiating between groups that use elaborate versus restricted language patterns.

Table 53

Frequencies and Percentages for Types of Dyadic Interaction ETs Based on their Relative Duration

Duration of ETs	f	%
Brief ETs (2 to 3 moves per ET)	3,409	62%
Moderate ETs (4 to 7 moves per ET)	1,652	30%
Sustained ETs (8 or more moves per ET)	414	8%

<u>Content orientation of educational transactions</u>.

Classifying the content orientation of ETs initially involved the use of nine categories. As can be seen on the table below, only 24 ETs out of the 10,366 ETs, could not be classified in one of the eight content orientation categories; a finding which indicates that the classification system is viable. By far the most frequently occurring ETs were those that were purely instructionally oriented. The next largest category was for ETs in which no content or tation predominated. Purely substantive, followed by predominantly instructional, were the next most frequently classified content orientations for ETs. Slightly less frequent were the ETs that involved a purely combined content orientation. In descending order, the least frequently classified content orientations were for ETs that were: (1) predominantely substantive, (2) purely unclear, and (3) predominantly combined.

Table 54

Frequencies and Percentages for the Original Content Orientation Classifications of Educational Transactions by Parent/Child Dyads

ET Content Orientation Classification	f	%

Purely Substantive ETs	1,316	12.7
Purely Instructional ETs	4,631	44.7
Purely Combined ETs	933	9.0
Purely Unclear ETs	288	2.8
Predominantly Substantive ETs	328	3.2
Predominantly Instructional ETs	1,037	10.0
Predominantly Combined ETS	188	1.8
Not Predominantly Oriented ETs	1,621	15.6
Unknown Classification ETs	24	.2

For the analyses to be reported here, content orientation classifications were combined so that five categories could be utilized. All purely and predominantly substantive ETs were combined and labeled as substantively oriented ETs (SUBET). Purely instructional and predominantly instructional ETs were combined forming a category of Instructionally Oriented ETs (INSET). Those ETs containing moves that either purely, or predominantly, referred to both content areas (substantive and instructional) within each move, were added together to create the larger category of combined content orientation ETs (COMBET). The category of ETs for which no predominant content orientation (NOTPRE) could be established, using the ratio system that had been devise, was not altered. The purely unclear and unclassifiable ETs were incorporated into one category of ETs that had no content orientation (NONOET). (See table 4 in the definitions section of chapter 2 for examples of content orientations.) Table 55 provides the frequencies and percentages for the five types of content orientations analyzed for this study.

Table 55

Frequencies and Percentages Content Orientations for Educational Transactions between Parent/Child Dyads

ET Content Orientation Classifications	f	%
Substantively Oriented ETs (SUPET)	1,644	15.9
Instructionally Oriented ETs (INSET)	5,668	44.7
Combined Orientation ETs (COMBET)	1,121	10.8
Not Predominantly Oriented ETs (NOTPRE)	1,621	15.6
No Content Orientation (NONOET)	312	3.0

Parent/Child Educational Transactions

Seventeen variables were analyzed to provide data for describing and comparing some of the characteristics of the parent/child educational transactions (ETs) that had transpired during the two semi-structured free-play (SSFP) and the structured block sorting task (SBST) activity. The mean number of ETs per dyad, the mean number of words per ET, and the initiator of each ET (P first or C first) were determined. The duration, the interactive quality, and the content orientation of ETs were also classified and mean proportions were calculated. The mean proportions for all seventeen variables are provided in Table 56.

Table 56

Mean Percentages for Educational Transaction (ET) Variables During Parent/Child Interactions

Educational Transactions by Dyads	Family Group NDG	NDB	DDB	Activity SSFP	SBST	Parent M	F
	Means Percentages for Dyads ET Behavior						
# of ETs per dyad[ab]	99	92	133	141	75	109	107
% P ETs	84	84	82	83	84	84	82
% C ETs[cd]	71	73	70	72	70	69	73
# words per ET[a]	11.3	15.3	9.3	12.2	13.1	13.3	12.0
P First move[b]	62	64	65	61	67	66	62
C First move[b]	38	36	35	39	33	34	38
Duration and Interactive Quality							
P Input ETs[cd]	29	27	30	28	30	31	27
C Inputs ETs	16	16	18	17	16	16	18
Dyadic ETs[d]	54	56	53	55	54	53	55
Brief ETs[c]	34	34	32	33	33	32	35
Moderate ETs[e]	16	17	16	17	16	17	[illegible]
Sustained ETs	4	5	4	4	5	5	4

Content Orientation							
Substantive ETs[b]	17	18	17	13	22	18	17
Instructional ETs[b]	52	53	50	57	46	49	53
Combined ETs	12	11	12	11	12	12	11
Not Predominant ETs	17	17	16	16	18	18	16
Not Clear ETs[a]	2	1	6	3	3	3	3

[a]Significant main effect for Family Group.
[b]Significant main effect for Activity.
[c]Significant main effect for Parent Sex/Role.
[d]Significant interaction effect for Family Group X Parent Sex/Role.
[e]Significant interaction effect for Parent Sex/Role X Activity.

A summary of the results of the ANOVAS of the parent/child ET data is presented in Table 57. A brief report of the significant results follows the table.

Table 57

Summary of Analyses of Variance for Educational Transactions by Parent/Child Dyads: Family Group X Parent Sex/Role X Activity (With repeated measures for Parent Sex/Role and Activity)

Educational Transactions by	Family Group (A)	Parent Sex/Role (B)	Activity (C)	AXB	AXC	BXC	AXBXC
			F Ratios for Ed'l Transactions				
# of ETs per dyad	5.72*	.03	37.96***	1.31	2.26	2.56	.02

% P ETs	.23	2.46	.49	1.18	.13	.01	.41
% C ETs	.71	6.00*	2.12	4.48*	.61	.40	.87
#of Words per ET	20.15***	3.01	1.36	1.08	.32	1.67	1.00
P First Move	.52	2.58	7.43*	.77	.52	1.13	.32
C First Move	.52	2.58	7.43*	.77	.52	1.13	.32
P Input ETs	.72	6.00*	2.12	4.47*	.61	.40	.87
C Input ETs	.23	2.48	.49	1.18	.13	.01	.41
Dyadic ETs	.79	.97	.40	5.00*	.34	.32	.78
Brief ETs	.53	6.26*	.00	2.08	.16	2.07	.21
Moderate ETs	.29	.10	3.36	2.29	.90	6.03*	1.65
Sustained ETs	.61	1.77	.27	1.87	2.79	2.13	.04
Substantive ETs	.06	1.15	16.06***	1.59*	.32	.01	1.62
Instructional ETs	.47	1.79	21.04***	.01	.49	.57	.09
Combined ETs	.14	.31	1.41	.53	.22	.05	.19
Not Predominant ETs	.36	1.08	1.97	.54	.33	.32	.10
Not Clear ETs	13.11***	.07	1.21	1.69	.19	1.39	.38

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

The sex and/or developmental status of the child (i.e., Family Group) significantly influenced the mean number of ETs that occurred during the parent/child interactions. Dyads with DDB engaged in the highest mean number of ETs, a result which reflects the greater number of moves that these dyads had emitted. Since, on the average, these dyads had uttered fewer words per move, it is not surprising that they also uttered less words per ET. Parents and their DDB also produced a significantly higher proportion of ETs whose content orientation could not be classified.

The differences in the mean proportions of brief transactions between dyads was directly influenced by the sex/role of the parent: father/child dyads produced more brief ETs than mother/child dyads did. The sex/role of the parent was also significantly related to the proportion of ETs that children engaged in (i.e., child ETs) and to the proportion of input ETs emitted by parents. In addition, the significant interaction between Family Group and Parent Sex/Role further influenced the proportion of Child ETs, and parent Input ETs. This interactive effect also influenced, the proportion of ETs which parents and children participated in together (i.e., dyadic ETs). As can be seen from the figures in Table 56, below, NDG and particularly DDB were involved in more ETs (i.e., child ETs) when they were interacting with their fathers than when they were interacting with their mothers. Since child ETs included both children's input ETs (i.e., monologues by children), and the dyadic ETs (i.e., ETs in which a dialogue between parent and child occurred), it is important to look at these two contributing variables.

Table 58

Mean Proportions of ET Variables Influenced by a Parent Sex/Role by Family Group Interaction

Educational Transaction Variable	Parent Sex/Role: Mother			Father		
	Family Group			Family Group		
	NDG	NDB	DDB	NDG	NDB	DDB
Child ETs[ab]	69%	73%	65%	72%	72%	76%
Child Input ETs	14%	16%	18%	19%	17%	18%
Dyadic ETs[b]	55%	57%	47%	53%	55%	58%
Parent Input ETs[ab]	31%	27%	35%	28%	28%	24%

[a]Significant main effect for Parent Sex/Role, $p < .05$.
[b]Significant interaction effect for Family Group X Parent Sex/Role, $p < .05$.

As can be seen from Table 58, NDG, and to a slight degree, NDB did emit a higher proportion of input ETs when interacting with their fathers than when interacting with their mothers. Nevertheless, it appears that the significant difference between the mean proportion of dyadic ETs that occurred when DDB interacted with their mothers, versus their fathers, is what contributed most heavily to the results obtained for children's participation in ETs (child ETs).

Another variable which most be considered, since it also impinged on children's participation in ETs, is the degree to which parents relied on the use of input ETs, rather than engaging in dyadic ETs. As can be seen from the figures in Table 58, the lower proportion of input ETs by fathers of DDB coincides with a considerable increase in their sons participation in dyadic ETs. However, the lower proportion of input ETs by fathers of NDG seems to have had a different impact since it coincides with their daughters increased use of input ETs.

As was to be expected, the generally shorter SBST activity, during which significantly less moves had occurred, also evoked significantly less ETs. The patterns for the initiation of ETs were also influenced by a significant main effect for Activity. Since parents initiated significantly more ETs (P first) during the SBST activity, when their teaching role was more clearly prescribed, children's initiation of ETs obviously had to decrease significantly.

Educational transactions of a moderate duration (four to seven moves) were influenced by an interaction between the Parent Sex/Role and Activity factors. Father/child dyads, who had generally relied more heavily on the use of brief ETs (see Table 56) significantly decreased their proportion of moderate ETs when they were engaged in the SPST activity.

Table 59

Mean Proportions for Dyadic ETs of Moderate Duration during Educational Activities with Each Parent

Duration of Educational Transactions	Parent Sex/Role			
	Mother		Father	
	Activity		Activity	
	SSFP	SBST	SSFP	SBST
Moderate ETs (4 to 7 moves)	16%	17%	18%	14%

Note. Parent Sex/Role X Activity $F = 6.03$, $p < .05$.

The content orientation of ETs was also influenced by the activity that was being engaged in. The SBST task, since its emphasis was on a specific classification type task, resulted in a higher proportion of substantive ETs, and therefore a lower proportion of instructional ETs, in comparison with the content orientation of ETs occurring during the SSFP activity. None of the other types of content orientation ETs were significantly influenced by the Activity factor.

Parents' Educational Transactions

The data analyzed for describing and comparing parents' educational transaction behaviors consisted of the sum of all of the parent input ETs (i.e., their monologues) and all of *their* moves within the dyadic ETs (i.e., the dialogues). The mean proportions for the seven variables which were examined are provided in Table 60.

Table 60

Mean Percentages for Parents' Educational Transaction Behavior During Parent/Child Interactions

Parent ETs	Family Group NDC	NDB	DDB	Activity SSFP	SBST	Parent M	F
	Means Percentages for Parents' ET Behavior						
M # Words per ET[abc]	11.4	13.7	9.2	10.5	12.3	12.3	10.5
Interactive Quality of Parent ETs							
Input ETs[d]	35	33	36	33	36	37	33
Content Orientation of Parent ETs							
Substantive[b]	13	14	16	11	18	14	14
Instructional[bc]	55	54	54	61	48	51	57
Combined	15	14	16	14	16	16	14
Not Predominant[abce]	15	18	13	13	18	17	13
Not Clear	.8	.4	.3	.6	.5	.6	.5

[a]Significant main effect for Family Group.
[b]Significant main effect for Activity.
[c]Significant main effect for Parent Sex/Role.
[d]Significant interaction effect for Family Group X Parent Sex/Role.
[e]Significant interaction effect for Family Group X Activity.

A summary of the ANOVAS results for parents' ET behaviors is provided in Table 61. A brief report of the significant results follows that table.

Table 61

Summary of Analyses of Variance for Parents' Educational Transaction Behavior: Family Group X Parent Sex/Role X Activity (with repeated measures for Parent Sex/Role and Activity)

Parents' ETs	Family Group (A)	Parent Sex/Role (B)	Activity (C)	AXB	AXC	BXC	AXB XC
	F Ratios for Parents' Ed'l Transaction Behavior						
M # Words per ET	10.16***	4.88*	5.60*	.88	.91	1.31	.87
Input ETs	.85	4.25	2.34	5.25*	.62	.44	.80
Substantive ETs	1.14	.00	24.00***	1.13	.38	.32	.26
Instructional ETs	.05	5.72*	25.29***	.30	1.28	[illegible]	.29
Combined ETs	.74	1.44	.89	.29	.42	[illegible]	[illegible]
Not Predominant ETs	4.65*	6.12*	12.83**	1.36	4.33*	.86	.17
Not Clear ETs	1.85	.10	.07	1.00	.28	2.22	.44

* $p < .05$. ** $p < .01$. *** $p < .001$.

Of the seven educational transaction variables analyzed for parents' contributions only two were influenced by the Family Group factor. Parents of DDB uttered the lowest mean number of words per ET. Parents of NDB uttered the highest mean number of words per ET. These results are consistent with the results for the mean number of words per move.

(See section on results for "Discourse Behaviors").

Parents of DDB also relied least on the use of ETs without predominant content orientation, that is, of ETs that did not focus primarily on references to substantive or to instructional content, nor relied predominantly on moves that contained references to both of the content areas concurrently. (Examples of ET content orientation types can be found in the definitions section of chapter 1.) These ETs tend to be syntactically and semantically more complex because the content area being focused on is shifting fairly rapidly. As a result these ETs probably require more advanced verbal decoding skills than DDB have mastered.

The sex/role of the parents had a significant main effect on three of the parent variables. On the average, mothers uttered more words per ET,[1] and they relied more on the use of ETs with no predominant content orientation. Fathers, on the other hand, relied more heavily on the use of ETs whose content orientation was instructional. It is important to note that fathers did not emitted significantly more rating or orders moves, but did offer significantly more opinions about the instructional aspects of the activities than mothers did. Therefore, it seems likely that during fathers' instructionally oriented ETs they were frequently offering opinions about the materials and the task at hand.

Although there was a trend for mothers to devote a higher proportion of the ETs that they participated in to monologue behavior (i.e., the ratio of parent's input ETs to all the ETs they participated in $F = 4.15$, $p < .06$), it was the interaction effect for Family Group by Parent Sex/Role which proved to be the significant influence of this parental variable. As can be seen from Table 62, the largest difference in the mean proportions of parent input ETs was between mothers of DDB and fathers of DDB.

Table 62

Mean Proportions of Parent Input ETs For Three Groups of Parents

Interactive Quality of ET	Parent Sex/Role Mother NDG	NDB	DDB	Father NDG	NDB	DDB
Input ET	36%	32%	42%	35%	34%	30%

Note. Parent input ETs = the proportion of all ETs parents participated in that were monologues. Family X Parent Sex/Role interaction term $F = 5.25$, $p < .05$.

The activity being engaged in was an influential factor for four of the seven variables analyzed. The mean proportion of parent ETs that were instructionally oriented decreased during the SPST activity; however, the mean number

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[1] Mothers had used somewhat more words per move than fathers, but that difference was not significant at the .05 level.

of words uttered by parents per ET, the mean proportion of their substantively oriented ETs, and of their ETs with no predominant orientation, all increased during that activity. Furthermore, as is clear from the figures in Table 63, the proportions of parents' ETs with no predominant content orientation were also affected by the interaction between Family Group and Activity. As has been noted previously ETs with no predominant content orientation are less clearly focused on substantive or instructional content. Therefore they tend to be more confusing and complicated to decode; however, these ETs are also likely to function as an efficient means for rapidly imparting diverse, but task relevant information. Since they are more complex to understand, it is likely that these ETs are least appropriate for DDB.

Table 63

Mean Proportions for Parents' ETs with No Predominant Content during Educational Activites

Content Orientation of ET	SCTP Activity			SBST Activity		
	Family Group			Family Group		
	NDG	NDB	DDB	NDG	NDB	DDB
Not Predominant	12%	12%	13%	18%	23%	13%

Note. Parents' not predominant ETs represent the proportion of all the ETs that parents participated in (i.e., all ETs excluding children's inputs) that were not focused predominantly on substantive or instructional content. Family Group X Activity interaction term $F = 4.33$, $p < .05$.

<u>Children's Educational Transactions</u>

The data analyzed for describing and comparing children's educational transaction behaviors consisted of the sum of children's input ETs (i.e., their monologues) and all of <u>their</u> moves within the dyadic ETs (i.e., the dialogues). The mean proportions for the seven child variables which were examined are provided in Table 64.

Table 64

Mean Percentages for Children's Educational Transaction Behavior During Parent/Child Interactions

Child ETs	Family Group NDG	NDE	DDB	Activity SSFP	SSST	Parent M	F
	Mean percentages for Children's ET Behavior						
M # Words per ET by C [ab]	5.1	5.0	2.4	4.7	3.7	4.0	4.4
<u>Interactive Quality Child of ETs</u>							
Input ETs	24	23	25	24	24	23	25
<u>Content Orientation Child of ETs</u>							
Substantive [b]	20	19	15	14	22	19	17
Instructional [b]	50	52	41	53	42	45	50
Combined	8	10	7	9	6	9	9
Not Predominant	8	9	7	8	8	3	8
Not Clear	1	1	2	1	1	1	1

[a]Significant main effect for Family Group.
[b]Significant main effect for Activity.

A summary of the ANOVAS results for children's ET behaviors is provided in Table 65 and is followed by a brief report of the significant results.

Table 65

Summary of Analyses of Variance for Children's Educational Transaction Behavior:

Family Group X Parent Sex/Role X Activity

(with repeated measures on Parent Sex/Role and Activity)

Child ETs	Family Group (A)	Parent Sex/Role (B)	Activity (C)	AXB	AXC	BXC	AXB XC
		F Ratios for Childrens ET Behavior					
M # Words per ET by C	14.22***	2.18	14.38**	.21	2.05	3.00	.46
Input ETs	.41	.57	.03	2.23	.06	.06	.59
Substantive ETs	1.63	.56	7.15*	.03	1.18	.07	1.36
Instructional ETs	2.69	3.12	20.00***	.58	1.58	.66	1.90
Combined ETs	1.63	.15	.65	.88	1.93	.08	.79
Not Predominant ETs	.61	.03	.15	2.16	.75	.25	.53
Not Clear ETs	1.09	.06	1.53	1.07	2.92	.08	.67

* $p < .02$. ** $p < .01$. *** $p < .001$.

As was to be expected, the mean number of words DDB uttered per ET was significantly lower than the means for NDG or NDB whose language skills were not delayed. No other significant main effects or interaction effects were revealed for the Family Group or the Parent Sex/Role factors.

The Activity factor had a significant main effect of three of the seven child variables analyzed. The mean number of words children uttered per ET and the mean proportion of substantively oriented ETs by children increased during the SBST activity. During this same activity the mean proportion of instructionally oriented Child ETs decreased.

Summary

In general, as was also true for the results for the discourse variables, the ET variables analyzed were most frequently influenced by the context in which the behavior was observed (i.e., the activity being engaged in). Family Group differences were not frequent and seem to occur most when the language skills of the children were relevant. Differences attributable to the sex/role of the parents were also limited and appear to have had more of an influence on the interactive quality and duration of the ETs than on their content orientation.

Summaries of the results of the analyses of educational transactions between parent/child dyads, as well as, the analyses of parents' ST behavior and of childr - behaviors and their relationship to the hypotheses of this study are provided in tables in Appendix H.

PROCESS-PRODUCT RELATIONSHIPS

The results reported in this final section are from a correlational study undertaken to determine if there were certain process-product relationships between the relative proportions of the observed behaviors of parents and/or their children, and their degree of success in achieving the educational objectives prescribed for the structured activity. Because complex behavioral interactions uccur within family systems, rather than just between dyads, the 35 discourse variables and 21 educational transaction variables that were selected were correlated, both with the scores obtained by children after they had been taught a block sorting task by their mothers (C/M BST scores), and with the scores they obtained after they had been taught a block sorting task by their fathers (C/F BST scores). Since the results of the previously reported analyses had indicated that the activity being engaged in frequently influenced the observed behaviors, correlations were calculated separately for the behaviors observed during the semi-structured free-play (SSFP) activity and the structured block sorting task (SBST activity.

As a result of these procedures, four correlations were calculated for each of the behavioral variables being analyzed. For example, in Table 66 40 column one contains the correlation between the proportion of moves that mothers contributed during the SSFP activity and the C/M BST scores. Column two contains the correlation between the proportion of moves by mothers during the SBST activity and those same C/M BST scores. Columns three and four contain the correlations between the proportion of moves mothers contributed during the SSFP and SBST activities, respectively, and the BST scores children obtained after their fathers had taught them a block sorting task (i.e., C/F BST scores).

Tables 66 through 69 provide the correlational results for the selected discourse variables, while Tables 70 and 71 contain the correlational results for the educational transaction variables. Following each table the significant results will be specified and when it seems relevant those results will be commented on briefly. A more thorough discussion of these results will be include in chapter 5. Summaries of these results and their relationship to the hypotheses of this study are provided in tables in Appendix H.

Relationships Between Discourse Behaviors and BST Scores.

In general, increases in the proportion of mothers' discourse behaviors were most frequently related to the scores their children obtained after the mothers had taught the task; however, they were also frequently related to the scores obtained after the fathers had taught the task. This finding offers some supports for the suggestion that the influence of parents on child is directional and goes from mother to child to father to mother (Clarke-Stewart, 1978a) The proportion of fathers' discourse behaviors were only somewhat more frequently related scores obtained by children after F/C interactions than after M/C interactions.

The proportion of discourse behaviors by children, when they were interacting with their mothers, were most frequently related to the scores they obtained after M/C interactions; however, a few of the children's discourse behaviors, vis a vis their mothers, were also associated with the scores they obtained after F/C interactions. Surprisingly, children's discourse behavior during F/C interaction were less frequently related to C/F BST scores than to C/M BST scores. Again supporting previous finding which suggest that the influence of father/child interactions is frequently indirect (Belsky, 1981; Clarke-Stewart, 1978a; Patterson, 1980).

This overview of the patterns of relationships between observed behaviors and BST scores, underscores the complexity of the influences of the behaviors observed during parent/child interactions, and the importance of investigating not only behaviors which appear to be directly related to an outcome (e.g., correlations between mothers' behavior during M/C interactions and C/M BST scores), but also behaviors which may be indirectly related to an outcome (e.g., correlations between mothers' behavior during M/C interactions and C/F BST scores).

Pedagogical move types.

Table 66 contains the correlations for discourse variables coded under the Pedagogical Move Types facet of the observation system.

Table 66

Correlations between Pedagogical Move Types and Block Sorting Task Test (BST) Scores

Pedagogical Move Types	Activity during which behavior occurred: SSFP	SBST	SSFP	SBST
	Correlations with BST scores obtained after Mothers Taught (C/M BST score)		Fathers Taught (C/F BST score)	
% of Moves Contributed				
by Mothers	-.43*	-.14	.01	.15
by Fathers	.07	.22	.11	.27
by Children with M	.42*	.14	-.00	-.16
by Children with F	.09	-.22	-.11	-.27
% of Initiatory Moves (Soliciting & Structuring Moves)				
by Mothers	-.77***	-.45*	-.44*	-.41
by Fathers	-.63**	-.32	-.26	-.14
by Children with M	.60**	.20	.30	-.08
by Children with F	.27	.23	.05	-.03

M Number of Words per Move				
by Mothers	.07	.17	.24	.27
by Fathers	.61**	.55**	.36	.19
by Children with M	.67**	.58**	.30	.14
by Children with F	.58**	.47*	.39	.20
% of Nonverbal Moves				
by Mothers	.27	-.01	.26	.29
by Fathers	.34	.16	.23	-.26
by Children with M	-.53**	-.41	-.09	.23
by Children with F	-.13	-.34	-.18	.02
% of Answering Moves[a]				
by Mothers	.61**	.20	.53**	.13
by Fathers	.06	-.05	-.00	-.18
by Children with M	.32	.36	-.12	.19
by Children with F	.20	-.42*	-.16	-.28

Note. SSFP denotes the semi-structured free-play activity. SBST denotes the structured block sorting activity. Correlations coefficients for Reactive moves (Responding & Reacting Moves) were identical to those for Initiatory moves, but the positive and negative direction of r were reversed.

[a]Answering moves = the ratio of Responding moves by one member of the dyad to Soliciting moves by the other member of the dyad.

As can be seen from the previous table, the proportion of moves contributed by mothers during the SSFP activity was related to C/M BST scores. That correlation was negative, and considered together with the negative correlation for the proportions of initiatory moves by mothers during both activities, and the positive correlation for children's initiatory moves during their M/C interaction, these results seem to indicate that, for this sample, there was generally a significant relationship between mothers' efforts to direct and control the interaction with their children and the lower BST scores of those children, especially after mothers had taught them the task.

The proportion of moves contributed by fathers was not significantly related to the BST scores children obtained after either parent had taught the task. Furthermore, the proportion of fathers' initiatory moves during the SSFP activity was only related to lower scores obtained after the M/C interactions. Although the correlations obtained did not prove significant, higher proportions of initiatory moves by fathers during both activities were also negatively correlated to children's BST scores regardless of the sex/role of the teaching parent. Therefore, it does appear that such behaviors by fathers were also not productive for enhancing their children's BST performance. However, in interpreting these negative correlations for initiatory moves by parents, it is important to remember that for the variable of parents' initiatory moves family group differences were significant. Parents of DDB utilized such moves relatively more frequently than parents of NDG or NDB, and of course DDB, as a group, had, as expected, performed less ably on the BST tests.

The mean length of utterances (MLU) by children provides an estimate of the level of their language acquisition skills (Brown, 1973; Cazden, 1972). Furthermore, the MLU for parents interacting with young children have been shown to be related to the MLU of those children (Gleason &

Weintraub, 1979; Snow, 1977). The mean number of words per move, a measure used for this study, is assumed to provide similar information, and was also of particular interest since four of the possible eight points that could be obtained on the BST tests were for the child's verbal justification of their block sorting. It may be recalled that the results from the demographic data had indicated that normally developing boys who scored higher on the PPVT; that is, had higher levels of receptive language skills, also scored higher on their C/M BST tests. In any case, the significant positive correlations between the C/M BST scores and the mean number of words per move for all the children during both activities with both parents, as well as the negative correlation between children's C/M BST scores and their proportion of nonverbal moves during the SSFI activity, suggests that, for this sample of children, their verbal facility enhanced the probability of obtaining higher BST scores after mothers had taught the task.

Although increases in mean number of words per move by fathers and their children, during both activities, were significantly related to higher C/M BST scores, neither the increased verbal output, nor the proportion of nonverbal moves by fathers, or by children interacting with their fathers, were significantly related to C/M BST scores.

The significant positive relationship between the ratio of mothers' responding moves to children's soliciting moves (i.e., answering moves) during the SSFP activity, and the BST scores obtained by children, regardless of which parent had taught the task, indicates that an increased willingness by mothers to listen to and be responsive to their children's questions, when they were not engaged in teaching a specific structured task, was a productive interactive strategy associated with the subsequent successful outcomes of the structured teaching/learning activities.

For children and fathers increases in their proportions of answering were not associated with higher BST scores; however, for children the relationship between their BST scores and their answering behavior varied depending on the sex/role of the parent involved in the interaction. Increases in children's answering responses to their mothers' solicitations during both activities, were positively, but not significantly related to their C/M BST scores, while higher proportions of children's answers to their fathers questions during the SBST activity were significantly, but negatively correlated with their C/M BST scores. Answering their fathers was also negatively, but not significantly associated with children's C/F/ BST scores.

Content references.

Table 67 contains the correlational results for references to the two types of content (i.e., Substantive Meaning and Instructional Meaning).

Table 67

Correlations between Content References and Block Sorting Task (BST) Scores

Content Referred To	Activity during which behavior occurred SSFP	SBST	SSFP	SBST
	Correlations with BST scores obtained after Mothers Taught (C/M BST score)		Fathers Taught (C/F BST score)	
% Substantive Content Moves				
by Mothers	-.34	.50*	-.25	.30
by Fathers	-.47*	-.44*	-.44*	.17
by Children with M	.21	.54**	-.00	.29
by Children with F	-.24	.09	-.27	-.34
% Instructional Content Moves				
by Mothers	.08	-.47*	-.06	-.05
by Fathers	.20	.00	.17	-.13
by Children with M	.24	-.49*	.00	-.28
by Children with F	.42*	-.08	.33	-.05
% Cognitive Action Moves				
by Mothers	-.14	.07	.26	.19
by Fathers	.37	.23	.42*	.04
by Children with M[t]	.30	.36	.57**	.30
by Children with F[t]	.45*	.29	.56**	.35

Note. SSFP denotes the semi-structured free-play activity. SBST denotes the structured block sorting activity.
[t]tenuously reliable variable.

In looking at Table 67, it is not surprising to find that mothers who referred to substantive content more frequently while they were teaching the block sorting task, were likely to have children who obtained higher C/M BST scores. Under these circumstances (i.e., interacting with mothers during the SBST activity) children who referred to substantive content more frequently also were more likely to have higher C/M BST scores. Conversely, references to instructional content by mothers, or by children interacting with their mothers, were not productively related to higher C/M BST scores.

The relationship of content references and BST scores after F/C interactions was unexpected. The figures indicate that there was a negative relationship between fathers who refer to substantive content more frequently during the SSFP activity and both their children's C/M and C/F BST scores. In addition, higher proportions of references to substantive content by fathers when they were teaching the block sorting task, were also negatively associated with C/M BST scores.

During the F/C interactions, the proportion of fathers' references to instructional content and their children's references to instructional content were not significantly related to the C/F BST scores. However, increases in children's references to instructional content to their fathers, during the SSFP activity, were associated with higher BST scores after F/C interactions.

The results obtained for references to general content areas are further corroborated by the results for the verbal-logical moves summarized in table 69, and seem to indicate that, for this sample of children, providing higher proportions of references to substantive content was only a productive strategy for mothers and their children, and then only when such abundant references occurred in the context of the structured, goal oriented task that the children were tested on.

The category for coding specific references to cognitive actions turned out to be largely devoted to comments about knowing or not knowing something (e.g., C: What's this for? M: I don't know. F: We have to match these blocks by height, understand?). Rarely did parents or children refer to remembering something or to thinking about something. Therefore, this category largely reflected comments which functioned as diagnostic probes for parents. For their children these moves functioned as a means for providing diagnostic information about what they did or did not already know.

During M/C interactions, references to cognitive actions by mothers, and their children, were not significantly related to C/M BST scores. However, references to cognitive actions by fathers during the SSFP activity, were positively correlated with the BST scores their children obtained after fathers had taught them the task.

Children who more frequently made comments to their fathers about what they did or did not know during the SSFP activity obtained higher scores on both their C/M BST scores and on their C/F BST scores. In addition, references by children to cognitive actions while interacting with their mothers during the SSFP task, were also positively related to C/F BST scores. It appears then that the sharing of diagnostic information by fathers and their children during the SSFP activity was a productive exchange. It may be that, as Gleason and Weintraub (1979) have suggested, fathers are more likely than mothers, to operate under developmental stereotypes, and less likely to be fully aware of their children's actual individual capacities. If this is so, then the ability of the children in this study to provide relevant diagnostic information can be viewed as an important contribution that enabled fathers to adjust their teaching techniques and strategies to match their children's individual needs more effectively.

Communicative Functions.

Table 68 contains the correlational results for the communicative functions of the verbal-logical moves coded under the substantive-logical and instructional-logical

by Children with F	.20	.15	-.09	-.09
% of Positive Rating Moves				
by Mothers	.76***	.51*	.35	.57**
by Fathers	.44*	.29	.09	.40
% of Negative Rating Moves				
by Mothers	-.54*	-.46*	-.51*	-.32
by Fathers	-.12	-.04	-.25	-.22
% of Positive Ratings with Substantive Content Feedback				
by Mothers	.53**	.45*	.51*	.55**
by fathers	.33	.37	.36	.35
by Children with M	.27	.25	.04	.12
by Children with F	-.03	-.12	-.05	-.08
% of Negative Ratings with Substantive Content Feedback				
by Mothers	-.43*	-.06	-.43*	-.08
by Fathers	-.15	.17	-.31	-.07
by Children with M	.08	.35	-.01	.31
by Children with F	.17	.22	.14	-.09

Note. SSFP denotes the semi-structured free-play activity. SBST denotes the structured block sorting activity.

[a]Explaining by children occurred so infrequently that reliability for coding this behavior could not be established.

[+]tenuously reliable.

Increases in moves whose communicative functions were associated with substantive content (i.e., substantive-logical moves), like increases in references to that substantive content, were not always directly and clearly related to success in mastering the block sorting task. Although the overall use of substantive-logical moves, and more specifically, those substantive-logical moves that involved providing or requesting substantive information by mothers and their children during their SBST interactions, were positively related to the C/M BST scores, the use of substantive-logical moves and moves involving providing or requesting substantive information by fathers and their children during both activities, were negatively, though not significantly associated with the C/F BST scores.

Correlations for the specific verbal-logical behavior of explaining substantive content were only calculated for parents, since this category was only reliably coded for parents. Mothers' explaining during the SBST activity was significantly related to C/M BST scores. Although there appeared to be a trend for fathers' explaining during the SSFP activity to be related to C/M BST scores (r =.41, but p <.05 if r =.42), increases in fathers' explaining substantive content to their children during both of the activities, were not significantly related to C/F BST scores.

The pattern for the relationships between BST scores and the frequencies of instructional-logical moves by mothers and fathers were similar and reciprocal. For mothers the use of instructional-logical moves during the SSFP activity was positively related to their children's C/M BST scores; however, their use of such moves during the SBST activity was only positively related to their children's C/F BST scores. In a complimentary fashion, fathers' use of instructional-logical moves during the SSFP activity was meanings facets of the observation system used for this study.

Table 68

Correlations between Communicative Functions and Block Sorting Task (BST) Scores Obtained when Parents Taught Their Preschool Children

Communicative Function of Logical Moves	SSFP	SBST	SSFP	SBST
	Correlations with BST scores obtained after Mothers Taught (C/M BST score)		Fathers Taught (C/F BST score)	
% of Substantive-Logical Moves				
by Mothers[t]	.14	.52*	-.14	.09
by Fathers[t]	-.25	-.24	-.23	-.11
by Children with M	.29	.56**	.18	.36
by Children with F	.02	-.17	-.04	-.02
% of Explaining Substantive Content[a]				
by Mothers	.13	-.52*	-.05	-.26
by Fathers	.41	.33	.24	.33
% of Providing or Requesting Substantive Information				
by Mothers[t]	-.13	.53**	-.09	.10
by Fathers[t]	-.34	-.32	-.22	-.20
by Children with M	.27	.52*	.17	.35
by Children with F	-.02	-.15	-.08	-.01
% of Instructional-Logical Moves				
by Mothers[t]	.43*	.26	.26	.46*
by Fathers[t]	.34	.54**	.46*	.27
by Children with M	.43*	.08	.20	-.05
by Children with F	.42*	.32	.34	.24
% of Rating Moves				
by Mothers	.62**	.37	.12	.49*
by Fathers	.28	.27	-.09	.27
by Children with M	.05	.08	-.13	-.15

positively related to their children's C/F BST scores, while their use of such moves during the SBST activity was positively related to C/M BST scores.

Children's use of instructional-logical moves during the SSFP activity with their mothers was positively related to their C/M BST scores. Their use of instructional-logical moves with their fathers was, however, only positively related to their C/M BST scores.

In summary, from the collective results obtained for the substantive-logical and logical behaviors of parent/child dyads, it appears that relatively frequent exchanges of information about instructional aspects, particularly during the SSFP activity, was a strategy of dialogue behavior which was conducive for subsequent success in accomplishing the specific teaching/learning objectives of the SBST activity. However, extensive dyadic exchange of information about the substantive content seems to have been a strategy of dialogue behavior whose positive impact was limited to mother/child dyads, and which was directly contingent on the context in which it occurred; as evidenced by the fact that C/M BST scores were only positively related to the proportions of substantive-logical moves that occurred during the M/C SBST activity.

Rating moves by parents usually expressed their evaluations of their children's actions or statements. The use of such moves can be viewed as reflecting a technique for reinforcing or extinguishing behaviors. The results obtained indicated that BST scores were only significantly associated with higher proportions of rating moves by mothers. The overall proportions of rating moves by mothers during the SSFP activity were positively related to their children's C/M BST scores; however, mothers' use of rating moves during the SBST activity was only significantly related to their children's C/F BST scores.

Further analyses of the different types of rating moves corroborated and clarified the impact of mothers' rating behaviors. Irrespective of the context, increased proportions of moves by mothers' that provided positive ratings, positive ratings with concurrent substantive content feedback, and negative ratings (negatively correlated), were significantly related to higher C/M BST scores. In addition, the scores children obtained after interacting with their fathers were associated with the following types of rating behaviors exhibited by their mothers during M/C interactions: (1) positive rating during the SBST activity, (2) negative ratings during the SSFP activity (negative correlation), (3) positive ratings with concurrent substantive content feedback during both activities, and (4) negative ratings with concurrent substantive content feedback during the SSFP activity (negatively correlated).

The only rating behavior by fathers which was significantly related to children's BST scores was the proportion of fathers' positive rating moves during the SSFP activity; however, such moves by fathers were only related to C/M BST scores.

Extra-logical moves.

Table 69 contains the correlations between certain behaviors coded under the extra-logical meaning facet of the observation system, and the BST scores.

Table 69

Correlations between the Communicative Functions of Extra-Logical Moves and Block Sorting (BST) Scores Obtained when Parents Taught Their Preschool Children

Communicative Function of Extra-Logical Moves	Activity during which behavior occurred: SSFP	SBST	SSFP	SBST
	Correlations with BST scores obtained after Mothers Taught		Fathers Taught	
% of Extra-Logical Moves				
by Mothers	-.61**	-.83***	-.48*	-.53**
by Fathers	-.31	-.54**	-.46*	-.47*
by Children with M	-.46*	-.61**	-.38	-.26
by Children with F	.05	-.27	-.10	-.36

% of Orders Moves[a]				
by Mothers	-.73***	-.84***	-.56**	-.59**
by Fathers	-.33	-.42*	.40	-.52*
% of Noncompliance Moves[b]				
by Children with M	-.56**	-.63**	-.24	-.40
by Children with F	-.62**	-.34	-.39	-.46*

Note. SSFP denotes semi-structured free-play activity. SBST denotes structured block sorting task activity.

[a]Children rarely prescribed and/or prohibited their parents' actions. Therefore, correlations for children's orders moves were not calculated.

[b]Parent rarely overtly refused to comply. Therefore correlations for parents' noncompliance moves were not calculated.

*$p<.05$. **$p<.01$. ***$p<.001$.

Extra-logical moves by parents were predominantly initiatory that is, they were moves designed to direct their children's actions. Higher proportions of these moves by parents had a more dramatic relationship to children's BST scores than any of the other discourse behaviors tested. Mothers' more abundant use of extra-logical moves during both activities was significantly and negatively correlated with both C/M and C/F BST scores. Fathers' use of extra-logical moves during both activities was significantly and negatively related to C/F BST scores; however, only the use of such moves by fathers during the SBST activity was also significantly negatively correlated with C/M BST scores.

The most frequent extra-logical behavior by parents involved their specifically prescribing or prohibiting their children's actions (i.e., orders moves by parents). Not surprisingly, the results for these types of moves were similar to those for the total category of extra-logical moves. Mothers' orders moves during both activities were negatively associated with both C/M and C/F BST scores. Fathers' orders moves during the SBST activity were significantly negatively associated with both C/M and C/F BST scores, and there was a trend for fathers' orders during the SSFP activity to also be negatively related to C/F BST scores ($r = -.40$; $p < .05$ if $r = .42$).

Children's extra-logical moves were predominantly reactive and their use of these moves was significantly and negatively associated with C/M BST scores. Although children's use of extra-logical moves during F/C interactions was also negatively correlated with their C/F BST scores, this relationship did not prove to be significant.

Increased proportions of noncompliance moves by children, a specific behavioral subcategory of extra-logical moves, when they occurred in the context of both activities during M/C interactions, were negatively related to C/M BST scores. Higher proportions of noncompliance moves by children with fathers during the SSFP activity were only negatively associated with C/M BST scores; however, when such moves occurred during the F/C SBST activity they were significantly negatively related to C/F BST scores.

In summary, it appears that, for this sample, increased reliance on the use of extra-logical moves was not productive. The relative use, by parents, of extra-logical moves, which were largely devoted to prescribing and/or prohibiting their children's actions, was negatively related to BST scores and therefore does not appear to have been a constructive parent strategy for facilating the teaching or learning of the block sorting tasks. For children interacting with their mothers, increases in their uses of extra-logical moves, which generally involved reactive behaviors, were associated with poorer performances on their C/M BST tests. Furthermore, the results suggest that children who devoted a higher proportion of their moves to noncompliance either lacked certain essential skills or, by relying heavily on noncompliant behavior impeded their abilities to demonstrate their mastery of the block sorting tasks.

Relationships Between Educational Transactions and BST Scores

As had been true for the results of the discourse variables and BST scores, the results of the correlations between the educational transaction variables tested and the BST scores indicated that the preponderance of significant relationships involved behaviors by mothers during their interactions with their children. The ET behaviors of fathers, when they were significantly related to BST scores, were generally associated with higher BST scores obtained after mothers had taught, rather than after fathers had taught the task. Except for one variable, all the significantly correlated measures of children's behaviors were for behaviors that occurred during the M/C interactions, and most of these child behaviors were directly related to the BST scores obtained after M/C interactions. In general, it appears that measures of the interactive quality of the ET sequences were more frequently significantly related to BST scores, especially when M/C dyads were involved, than measures that reflected the duration or content orientations of the ETs.

Duration and interactive qualities parent/child ETs.

Table 70 contains the correlations for those variables which were used to measure the duration and interactive quality of the ETs that transpired during the parent/child interactions.

Table 70

Correlations between Duration and Interactive Quality of Educational Transactions (ET) and Block Sorting Task (BST) Scores

Duration and Interactive Quality of ETs	Activity during which behavior occurred: SSFP	SBST	SSFP	SBST
	Correlations with BST scores obtained after Mothers Taught (C/M BST score)		Fathers Taught (C/F BST score)	
Mean # of Words per ET during parent/child interactions				
Mother/Child	.23	.16	.51*	.40
Fathers/Child	.53*	.50*	.44*	.31
% ETs Parents Participated in				
Mothers	-.07	.03	.11	.48*
Fathers	.10	-.21	.07	.03
% ETs Children Participated in				
with Mother	.61**	.21	.13	.29
with Father	-.07	-.26	-.30	-.14
Initiated ETs (made first move)				
Mothers	-.47*	-.37	-.16	.03
Fathers	-.09	-.12	-.01	.10
Children with M	.47*	.37	.16	-.03
Children with F	.09	.12	.01	-.10
Initiated ET with Soliciting move				
Mothers	-.80***	.52*	-.49*	-.36
Fathers	-.59**	-.51*	-.38	-.23
Children with M	.42*	.11	.21	-.05
Children with F	.22	.25	-.02	-.09
Initiated ET with Responding move				
Mothers	-.21	-.07	.11	.17
Fathers	-.17	.13	-.16	.06
Children with M	-.46*	.06	-.06	-.03
Children with F	.15	.15	-.05	.02
% Input ETs (monologues)				

by Mothers	-.61**	-.21	-.13	-.29
by Fathers	.30	.26	.07	.14
by Children with M	.07	-.03	-.11	-.48*
by Children with F	-.10	.21	-.07	-.03
% Dyadic ETs (dialogues)				
Mother/Child	.61**	.17	.24	.52*
Father/Child	-.13	-.08	.00	-.32
% Brief ETs (2 or 3 moves)				
Mother/Child	.61**	.13	-.01	.23
Father/Child	.07	-.28	.12	-.07
% Moderate ETs (4 thru 7 moves)				
Mother/Child	.11	.17	.16	.51*
Father/Child	-.14	-.26	-.01	-.21
% Sustained ETs (8 or more moves)				
Mother/Child	-.08	.01	.34	.27
Father/Child	-.34	.16	-.19	.34

Note. SSFP denotes semi-structured free-play activity. SBST denotes structured block sorting task activity. Proportions of ETs initiated by soliciting and by responding moves were calculated for parents based only on the ETs they had participated in. and for children based only on the ETs they had participated in. The proportions for all the other variable were calculated based on the total number of ETs produced during the parent/child interactions.

*p<.05. **p<.01. ***p<.001.

The mean number of words per ET by dyads, which is a composite measure of the expressive verbal behavior of parent/child dyads, can be regarded as reflecting a level of conversational skills largely determined by the verbal behavior of the children involved in the interactions.[1] Referring to Table 70, one can see that the mean number of words per ET by M/C dyads during the SSFP activity was only significantly related to the BST scores obtained after fathers taught the task; however, the mean number of words by F/C dyads during the SSFP activity was significantly related to children's higher BST scores, regardless of which parent had taught the task. In addition, the mean number of words per ET by F/C dyads during the SBST activity was also associated with C/M BST scores. These results, along with the results for the mean number of words per move, (see Table 40), suggest that the mothers that were observed were more successful in facilitating their children's performance on the BST test when those children could demonstrate a higher degree of verbal skills, regardless of whether or not those verbal skills had been demonstrated during the M/C interactions.

The proportions of ETs participated in by parents and their children while the block sorting task was being taught, were not directly associated with BST scores. For mothers the proportion of ETs that they participated in during the SBST activity was only positively related to the BST scores obtained after the F/C interactions. For fathers the proportion of ETs that they participated in was not significantly related to either C/M or C/F BST scores. Furthermore, for children the proportion of ETs that they

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¹ Previous research has indicated that increases in the mean number of words per utterance by children are associated with higher levels of language acquisition (Brown, 1973, Cazden, 1972); and that the mean numbers of words used by parents interacting with their children are related to their children's levels of linguistic skills (Gleason, & Weintraub, 1979; Newport, Gleitman & Gleitman, 1977; Snow, 1977).

participated in during the M/C SSFP activity was only significantly related to their C/M BST.

The proportion of ETs initiated by any dyad member reflected the degree to which they were controlling and/or directing the interaction. This behavior was only significantly related to C/M BST scores, and then only when it had occurred in the context of the M/C SSFP activity. Higher proportions of initiations of ETs by mothers were associated with lower C/M BST scores, while higher proportions of initiations of ETs by children were associated with higher C/M BST scores.

Educational transactions could be initiated by moves that were expressed in four different linguistic forms (i.e., structuring, soliciting, responding, or reacting). However, since reliability for coding had only been unambiguously established for soliciting and responding moves, * only the results for the process-product relationship of these two types of ET initiating moves are reported. The use of soliciting moves to initiate ETs, (M = 39% of all ETs), particularly by parents, was significantly related to the BST scores obtained. Mothers' use of soliciting moves to initiate ETs in the context of the SSFP activity was significantly and negatively correlated with C/F BST scores, and even more highly negatively correlated with C/M BST scores, nevertheless, their use of soliciting moves to initiate ETs during the SBST activity was positively correlated with C/M BST scores. Fathers' use of initiating solicitations during both activities, while significantly negatively correlated with C/M BST scores, was negatively, but not significantly associated with C/F BST scores.

The proportion of children's initiating solicitations was positively related to their C/M BST scores when that behavior occurred in the context of the M/C SSFP interactions.

Before interpreting the relationship between responding moves that initiated ETs, (M = 11% of all ETs), and BST scores, it is important to recall that for a responding move to initiate an ET it has to involve changing the topic of conversation. Initiation of this sort require that the other dyad member be flexible enough to continue the interaction, yet structured enough to reopen topics that are important for the objectives of the activity.

Higher proportions of ETs initiated by responding moves, when engaged in by children interacting with their mothers during the SSFP activity, were significantly and negatively related to their C/M BST scores. Increases in the proportions of such moves by either parent during either activity, or by children interacting with their fathers, were not significantly related to either C/M or C/F BST scores. It appears that children who change the topic of conversation with mothers during a free-play activity are utilizing a poor strategy either because they are demonstrating their distractibility or because mothers are not able to successful tolerate and manuever these children's behavior.

The interactive quality of ETs was further explored by determining the proportions of input ETs (i.e., monologues) and dyadic ETs (i.e., dialogues) that parents and their children had participated in. Higher proportions of input ETs by mothers during the SSFP activity were negatively related to C/M BST scores. The proportions of input ETs by fathers were not significantly related to BST scores. Although the relative use of input ETs by children interacting with their mothers during the SBST activity was negatively correlated with their C/F BST scores, their increased use of these monologues was not significantly associated with their C/M BST scores.

Although the proportion of dyadic ETs during the M/C SSFP activity was positively associated with higher C/M BST scores, the proportion of dyadic ETs during the M/C SBST activity was only positively associated with C/F BST scores. Father/child dyadic ETs were not significantly related to either C/M or to C/F BST scores.

The duration of ETs was determined by the number of moves that transpired during the dyadic ETs. The proportion of brief ETs (i.e., two to three moves) that occurred in the context of the M/C SSFP activity was significantly related to higher C/M BST scores. An increase in the use of moderate ETs (i.e., four to seven moves) by M/C dyads during the SBST activity was only significantly associated with C/F BST scores. No other significant relationships between the relative duration of ETs and BST scores were revealed.

Content orientation of parent/child ETs.

Table 71 contains the correlations between the BST scores and the content orientation of the parent/child educational transactions. For these analyses the content orientation was determined without regard to each speaker's individual contribution to the interaction. (See Table 72 for content orientations of parent ETs and child ETs).

Table 71

Correlations between Content Orientations of Educational Transactions (ET) and Block Sorting Task (BST) Scores

Content Orientation of Parent/Child ETs	Activity during which behavior occurred			
	SSFP	SBST	SSFP	SBST
	Correlations with BST scores obtained after Mothers Taught (C/M BST scores)		Fathers Taught (C/F BST scores)	
% of Substantively Oriented ETs				

Mother/Child	-.14	.38	.05	.05
Father/Child	.10	.48*	-.19	.37
% of Instructionally Oriented ETs				
Mother/Child	.08	-.50*	.05	-.22
Father/Child	.33	.13	.24	-.07
% of Combined Orientation ETs				
Mother/Child	.06	.02	-.14	-.02
Father/Child	-.15	-.31	-.17	-.19
% of No Predominant Orientation ETs				
Mother/Child	.29	.53**	.10	.45*
Father/Child	-.10	-.15	.03	.05
% of Not Clear ETs				
Mother/Child	-.45*	-.15	.25	-.13
Father/Child	-.53**	-.48*	-.19	-.31

*p<.05. **p<.01. ***p<.001.

In general increased or decreased use of specific content orientation patterns, within sequences of moves, had much less of an impact on children's BST scores than the duration or interactive quality of those sequences. For example, even though higher proportions of substantive moves by mothers and their children during the SBST activity (see table ?? #1) were positively correlated with the C/M BST scores, when sequences of moves were identified and their predominant content orientation was determined, higher proportions of substantively oriented ETs durinu the SBST activity did not reach an acceptable level of significance (r = .38, p <.05 if r =.41).

The main conclusion that these results warrant is that in order to analyze the impact of substantive, instructional, or combined content orientation patterns, it is probably more enlightening to assess patterns for individual speakers' contributions (see Table 72) rather than to analyze dyadic sequences.

The results for unclear ETs and those with no predominant content orientation are relevant for an understanding of the parent/child interactions. Unclear ETs rarely occurred during parent/child interactions; however, they occurred most frequently during P/DDB interactions. If the ETs are regarded as dialogues whose content clarity largely reflects the capacity of the child to express and elicit content relevant utterances, then the significant correlations between C/M BSI scores and higher proportions of unclear ETs during M/C SSFP activities, during F/C SSFP and F/C SBST activities can be viewed as further support for the suggestion that mothers seem to be less effective when they are teaching children whose verbal skills are delayed, even though that level of skill was not necessarily demonstrated during M/C SSFP or M/C SBST interactions with their children.

Educational transactions which do not have a predominant content orientation are by definition not as clearly focused on the substantive or the instructional aspects of the task at hand. Such condensed transactions are probably somewhat more confusing to decode, but more efficient, in terms of the amount of time used to communicate essential information about the task. Mothers made use of such transactions significantly more frequently than fathers, and from the results above, it appears that their use of these types of transactions during the SBST activity was a productive strategy both for C/M BST and for C/F BST scores. However, it is important to recognize that children whose cognitive and linguistic skills are more advanced would probably be most likely to be able to comprehend and respond effectively during such transactions. The correlations between the proportion of no predominant content orientation ETs during the M/C SBST activity and the C/M and C/F BST scores can be interpreted as support for the proposition that mothers and children with higher levels of verbal skills are a particularly good teacher/learner match.

To summarize, the results for the interactive qualities and the duration and the content orientation of parent/child ETs revealed that for F/C dyads only one behavior, their mean number of words per ET during the SSFP activity, was significantly related to their C/F BST scores. However, several of the behaviors observed during M/C interactions were positively associated with higher C/F BST scores. These behaviors were: (1) the mean number of words by M/C dyads during the SSFP activity, (2) the proportion of mothers' participation in ETs during the SBST activity, (3) the proportion of dyadic ETs that M/C dyads engaged in during the SBST activity, (4) the proportion of moderate ETs that M/C dyads engaged in during the SBST activity and (5) the proportion of ETs whose content was not predominantly oriented during M/C SBST interactions. The proportion of ETs that mothers initiated with soliciting moves during the SSFP activity, and the proportion of input ETs children contributed during the M/C SBST activity were also significantly, but negatively related to C/F PST scores.

Child/Mother BSI scores were significantly positively associated with: (1) the proportions of dyadic ETs that M/C dyads engaged in during the SSFP activity, (2) the proportions of brief ETs that M/C dyads engaged in during the SSFP activity, (3) the proportions of ETs that children participated in during the M/C/ SSFP activity, (4) the proportions of ETs children initiated during the M/C SSFP acitivty, (5) the proportions of ETs which were initiated by children's soliciting moves during the M/C SSFP activity, (6) the proportions of mothers' initiating ETs with soliciting moves during the M/C SBST activity, the proportions of ETs whose content was substantively oriented during the F/C SBST activity, and (8) the proportions of ETs with no predominant content orientation during M/C SBST activity.

In addition, C/M BST scores were significantly, but negatively associated with: (1) the proportions of ETs initiated by mothers during the M/C SSFP activity, (2) the proportions of ETs mothers initiated with soliciting moves during the M/C SSFP activity, (3) the proportions of input ETs that mothers contributed during the M/C SSFP activity, (4) the proportions of ETs children initiated with responding moves during the M/C SSFP activity, and (5) the proportions of instructionaly oriented ETs during the M/C SBST activity, and (6) the proportions of not clear ETs during the M/C SSFP activity.

The behaviors which occurred during the F/C interactions and which were significantly positively associated with C/M BST scores were: (1) the mean number of words per ET by F/C dyads during the SSFP activity, (2) the mean number words per ET by F/C dyads during the SBST activity, and (3) the proportions of substantively oriented ETs during the F/C SBST activity.

Increases in fathers initiation of ETs with soliciting moves during both F/C activities were significantly, but negatively associated with C/M BST scores and so were the proportions of not clear ETs that occurred during the F/C SSFP and SBST activities.

<u>Content orientation of parent ETs and Child ETs</u>.

Table 72 contains the correlations between the content orientations of ETs and the BST scores. For these analyses the ETs that parents and children participated in, and the moves each of them made were examined separately (see Educational Transaction section of Methods and Procedures, chapter 3, for content orientation coding procedures).

Table 72

Correlations between Parents' and Children's Educational Transaction Content Orientations and Block Sorting Task (BST) Scores

Content Orientation of parent ETs ~~and~~ of Child ETs	Activity during which behavior occurred: SSFP	SBST	SSFP	SBST
	Correlations with BST scores obtained after Mothers Taught (C/M BST scores)		Fathers Taught (C/F BST scores)	
% Substantive ETs				
by Mothers	-.30	.23	-.13	-.16
by Fathers	-.07	-.11	-.33	.15
by Children with M	.06	.11	-.33	.15
by Children with F	.05	.34	-.15	.18
% Instructional ETs				
by Mothers	.14	-.50*	.22	-.24
by Fathers	.23	.05	.34	-.12
by Children with M	.41	-.12	.03	-.45*
by Children with F	.36	.36	.11	.10
% Combined ETs				
by Mothers	-.11	.14	-.25	-.10
by Fathers	-.25	-.21	-.24	-.21
by Children with M	.66***	-.03	.31	-.02
by Children with F	.05	-.42*	.24	-.12
% Not Predominant Content ETs				

by Mothers	.19	.25	.05	.46*
by Fathers	-.13	.08	-.12	.37
by Children with M	.24	.32	-.17	.32
by Children with F	.20	.21	.22	.01
% Unclassified &/or Unclear ETs				
by Mothers	.09	.28	.08	.18
by Fathers	.23	-.01	-.04	.15
by Children with M	-.11	-.06	-.04	-.20
by Children with F	.35	-.17	.13	-.34

Note. SSFP denotes semi-structured free-play activity. SBST denotes structured block sorting task activity.
* $p<.05$. ** $p<.01$. *** $p<.001$.

The only significant relationship, between the content orientation of parents ETs and the BST scores, was a negative one for mothers' use of ETs with an instructional content orientation during the SBST activity. For children the proportions of their ETs with substantive orientation during the M/C SBST activity, and with combined content orientation during the M/C SSFP activity were positively related to their higher C/M BST scores. Children who relied more on instructional content ETs during their M/C SBST activity scored lower on their C/F BST scores, while children who relied more on combined content ETs during the F/C SBST activity scored lower on their C/M BST scores.

Summaries for the results of process-product relationships and the hypotheses these results addressed are provided in table form in Appendix H. Separate tables are provided for (1) pedagogical move types, (2) content references, (3) communicative functions of verbal-logical moves, (4) communicative functions of extra-logical moves, (5) duration and interactive qualities of educational transactions, and (6) content orientations of educational transactions.

This chapter consisted of results presented in three sections. The chapter which follows will focus on these reported results and represents an effort to integrate the descriptions and comparisons of the observed discourse behaviors, the educational transaction behaviors, and the process-product relationships that were analyzed.

Chapt V

DISCUSSION AND CONCLUSIONS

The data presented in the previous chapter described how parents and their preschool children interacted when they were deliberately engaging in teaching/learning activities that had different objectives. Interactive teaching/learning sequences, such as the ones observed for this study, are generally activated by dialectical and/or reciprocal dialogues. During these experiences both parents and their children function as teachers and learners, each teaching to, and learning from the other.

This study was not intended to address the issue of whether or not, or how much, parent's contribute to their children's cognitive development. Instead the interest being pursued was to understand how parents can contribute to their children's learning when they are consciously doing their best to fulfill their teaching role, and how children can influence their parents to perform optimally as their teachers. Focusing on parents as teachers is justified because parents generally have the most incentive and are able to provide the longest, most consistent committment of time to the enterprise of educating their own children.

Furthermore, the inclusion of parents as "consultants" in the planning and implementing of school based programs, particularly for the handicapped and disadvantaged, in addition to being legislatively mandated (Cohen, Semmes, & Guralnick, 1979), has also been shown to be an effective approach (Bronfenbrenner, 1974; Goodson & Hess, 1975; Meier, note 2). The challenge for researchers is to determine ways of maximizing the contribution that parents can make to the education of their own children. In order to do this appropriate instrumentation must be developed and parent/child teaching/learning interactions must be observed.

Since this study represents an initial effort in a neglected area using a select population, the results are not meant to be conclusive, nor are they meant to be globally generalized. The sample of 23 families who participated in this study, although comparable to many of the observational studies reviewed, is a small sample in relation to the number of variables that were analyzed. Furthermore, not all of the variables tested were independent. The decision by this investigator to risk the increased chance for spurious results, which such discrepancies involve, is justified by the heuristic nature of this study. There is a crucial need for alerting researchers and program developers to the importance of investigating cognitively oriented parent teaching behaviors before such behaviors can be constructively incorporated into training programs for parent-teachers. In view of this need, it is hoped that the descriptions and comparisons offered here will stimulate additional questions and offer some directions for generating reasonable and interesting hypotheses that subsequently can be tested.

An Instrument For Observing Parent/Child Teaching/Learning Interactions

One of the objectives of this study was to determine if a classroom interaction observation system could be productively used for observing parent/preschoolers interactions. Although it was found that some additional modifications are needed, particularly in operationalizing the coding of the communicative functions categories (e.g., defining, fact-stating), the Columbia Instrument (Bellack et al., 1966), as modified for use in this study, has the potential for being an excellent system for describing and evaluating cognitive aspects of parent/child interactions. Among its advantages are the fact that the instrument need not be used in its entirety. Depending on the emphasis of particular programs, the interests of researchers, or the needs of evaluators, any of the facets can be used independently. One could, for example, only code the linguistic forms used, or just the topics of conversation. The content area categories can be altered completely, just as was done for this study, in order to investigate specific academic content areas or even socio-emotional content. This instrument can be used to determine changes that result from general maturation, as well as for evaluating programmatic interventions that are being introduced. It appears to be particularly well suited for longitudinal studies.

For purposes of this study, the use of the modified Columbia Instrument turned out to be a challenging, time-consuming, and complex coding task. However, it did make it possible to collect a large amount of data that seems to accurately reflect the cognitive aspects of the parent/child interactions that were observed. The results obtained through the use of this instrument will now be summarized and discussed.

That mothers and even fathers can, do, and should be involved in teaching their own children is the assumption which underlies this study. The aim was to observe, describe, and compare how each parent taught their own preschooler, and how the structure of the task before them and the sex and/or developmental level of the child influenced their observed teaching/learning interactions.

<u>Mother Teaches, Father Teaches.</u>

To begin with, the fathers observed for this study, having been given an opportunity to assume a teaching role, demonstrated that they could teach their own preschool children. Even though these fathers had, by their own report, spent less time interacting with their preschoolers or engaged in teaching activities with them, they behaved quite similarly to mothers during both activities. Although there appears to have been some slight advantage (higher BST scores) for either parent when they were interacting with their same-sex child, fathers generally functioned as adequately as mothers did when they taught their children a prescribed block sorting task (C/M BST scores and C/F BST scores $r = .60$, $p < .01$).

Those significant differences that did emerge, between the way fathers and mothers conducted themselves during their teaching/learning interactions, reflected variations in the <u>degree</u> to which certain interactive behaviors were used rather than differences in the kinds of behaviors used (see Table 73).

Table 73

Teaching Behaviors that Differentiated Mothers from Fathers

Behaviors Influenced by Parent Sex/Role	Proportion of Moves Mothers	Fathers
Words by Parents	77%	72%
No Predominant Content ETs by Parents	17%	13%
Moves Contributed by Parents	59%	56%
Reacting moves by Parents[t]	42%	38%
Input ETs (monologues) by Parents	31%	27%
ETs children participated in with	69%	73%
Brief ETs (2-3 moves) between Dyads	32%	35%
Opinions about Instructional Content by Parents	14%	16%
References to Substantive Content by Parents	80%	75%
Instructionally Oriented ETs by Parents	51%	57%
Solicitations about Instructional Content by Parents	19%	23%

Note Behaviors included in this table were significantly influenced by the Parent Sex/Role factor, $p < .05$. ETs = educational transactions. No predominant content ETs tend to be syntactically and semantically complex.
[t]tenuously reliable category

The behaviors that differentiated parents are conceptually related and suggest that mothers and fathers function somewhat differently in terms of their teaching styles and the content they emphasize. As can be seen from table 74, below, mothers, in comparison to fathers, seemed to perform their teaching role by relying on a more verbal, assertive, and informative teaching style. The mother/child dyads seem to have concentrated more on sharing information about the substantive content that was relevant to the activities they were engaged in. In contrast, fathers seemed to perform their teaching role by being more interactive, egalitarian, and evaluatory than mothers were. These father/child dyads, like those observed by Osofsky and O'Connell (1972), seem to have concentrated more on the various tasks they were engaged in and on the actions required to complete these tasks.

Table 74

Differences in the Behaviors Observed during Mother/Child and Father/Child Interactions

Mother/Child Interactions	Observed Behaviors	Father/Child Interactions
Verbal, Assertive, Informative Teaching Style		Interactive, Egalitarian, Evaluatory Teaching Style
more	% of moves contributed by P	less
less	% of moves contributed by C	more
less	% of ETs child participated in (CEIs)	more
more	mean number of words per ET	less
more	% of no predominant content ETs by P	less
more	% of reacting moves by P	less
less	% of initiatory moves by C	more
more	% of reactive moves by C	less
less	% soliciting moves by C during SBSI	more
less	% of responses to parents solicitations (ANSWER by C)	more
more	% of P/C ETs initiated by unclear move (mostly done by C)	less
more	% of P/C ETs initiated by nonverbal move (mostly done by C)	less
less	% of brief ETs (2 to 3 moves)	more
more	% of moderate FTs (4 to 7 moves, during	less

	SBST acitivity)	
less	% of opinion moves by P (instructional content)	more
less	% of opinion moves by C (instructional content)	more
less	% of positive rating moves by C	more

Substantive Content Emphasis (conceptual/informational orientation)		Instructional Content Emphasis (action/task orientation)
more	% of references to substantive content by P	less
more	% of requesting of providing substantive information by P	less
more	% of positive ratings accompanied by substantive information by P (POSPLS)	less
less	% of solicitations about instructional content by P	less
less	% of instructionally oriented ETs	more
less	% of solicitations about instructional content by C during SBST (ASKINS)	more

Note. All differentiating behaviors were significantly different ($p<.05$), except for ANSWER by C ($p<.08$), POSPLS by P ($p<.07$), and ASKINS by C ($p<.07$). P = parents. C = children. ET = educational transactions.

When compared to mothers, fathers seemed to place more of an emphasis on modeling and eliciting evaluatory behaviors, that is, they offerred and asked for more opinions about the materials and the activities they were engaged in. Although evaluatory behaviors of this type occurred less frequently than many other verbal-logical behaviors, they do represent an important and often neglected aspect of teaching/learning interactions.

Benjamin Bloom and his associates (1956) described evaluation as a higher order cognitive process which requires some combination of all of the other cognitive behaviors, as well as involving personal standards and preferences. Although they had placed it as the last of the behaviors in their taxonomy of educational objectives for the cognitive domain, they stressed that:

> ...it is not necessarily the last step in thinking or problem solving. It is quite possible that the evaluative process will in some cases be the prelude to the acquisition of new knowledge, a new attempt at comprehension or application, or a new analysis and synthesis. (p.185)

Evaluatory behaviors in general and the ability to formulate reasonable opinions are clearly desirable educational goals, yet such behaviors have received little attention in the literature on observations of teacher/pupil or parent/child interactions. Unfortunately, even for the process-product study conducted as part of this research, opinion sharing was not analyzed to determine if it was related to the outcome of the structured teaching task. For future research it appears this variable should receive more attention, particularly if it continues to differentiate mothers from fathers.

In a sense one could say that the observed, teaching style of these mothers most closely represented that of some of the earliest social learning theorists, the Rhetoricians, such as Protagoras, Isocrates, and Quintilian, who believed in providing their pupils with models of verbal-logical skills par excellence, which their pupils were expected to imitate and later embellish upon as the need arose (Broody, 1963). Fathers, on the other hand, demonstrated a style of teaching which is similar to the Socratic Dialectic practised in ancient times by Socrates and Plato and more recently advocated by such humanists and social idealists as Froebel, Dewey, and Friere. These teachers believed that they, along with their pupils, must continue to clarify knowledge through actions and dialectical dialogues (Broudy, 1963; Dewey 1929/1960; Friere 1968/1970).

The history of educational methods indicates that these two different teaching styles are complimentary and have been productively combined (Broudy, 1963). The objective of integrating these styles is to develop the capacity for critically evaluating knowledge as it is being mastered so that eventually socially responsible actions can be undertaken (Dewey, 1929/1960; Friere, 1968/1970; Froebel, cited in Broudy, 1963 and Spodek, 1972).

Since the mothers and fathers that were observed generally behaved in a similar manner, the implication is that regardless of which parent assumes the teaching role the children would be exposed to the same general content. If, on the other hand, parents more equitably shared the responsibility for teaching their children, those children would have the opportunity to be exposed to more variations in interactive styles and content emphasis. These added experiences for more varied socio-emotional and intellectual stimulation can be expected to enhance children's educational experiences.

For parents of children with special needs sharing the responsibility for teaching their children is particularly important. Shared teaching responsibilities encourages a shared committment and appreciation of the efforts involved in raising a special child. It also lessens the danger that mothers, feeling overwhelmed, overburdened, and "burnt out" by the added stress of educating and managing a child with special needs, subtly withdraw from some of their responsibilities by abdicating their teaching role, thereby, leaving their children in an educational vacuum.

Certainly, in these times of changing roles and family structure it is a welcome piece of news that fathers can apparently be trusted to successfully teach their own children and that if their teaching style varies somewhat from mothers, this may actually reflect a "good mix" that results in a richer educational experience for children.

Mix and Match, Fathers, Mothers, Child

Evidence that a "good mix" may exist comes from the analysis of the relationship between some of the behaviors that were observed and the scores children obtained after being taught a prescribed block sorting task. Before discussing these results it is important to remind the reader that the behaviors that were analyzed were not tested to determine an all or none relationship. Instead, the results of the process-product study reflect the degree of behaviors, i.e., the relative quantity of behaviors by dyads in comparison to the other dyads who participated in this study. For example, the discovery that initiatory moves by parents are negatively correlated to the scores their children obtained on the block sorting task (BST) test means that parents who exhibited more of these moves, in comparison to the majority of the parents, had children who scored lower on the BST tests. It does not mean that all levels of initiatory behavior by parents are unproductive. In fact the results of the process-product study, in general, seem to indicate that curvilinear relationships may play an important role in determining the effectiveness of many of the behaviors that were related to the children's performance measure. Unfortunately, for this study only linear relationships were tested.

The reader is also reminded that some of the magnitude of the correlational results for certain behaviors may reflect significant differences between family groups. Most of these differentiated the dyads with developmentally delayed boys (DDB) from the dyads with normally developing boys (NDB) or girls (NDG). For example, 7 of the 23 children involved were developmentally delayed boys who, as was expected, scored lower on the BST tests. Furthermore, the available research (Cunningham et al., 1981; Kogan & Tyler, 1973; Shere & Kastenbaum, 1966), as well as the results from this study, indicate that the mothers of handicapped or delayed preschoolers are more directing and controlling than the mothers of normally developing children. Clearly these foregone conclusions can be expected to have contributed heavily to the finding that initiatory behaviors by mothers are associated with children's lower BST scores. In addition, such instances of confounding serve as a reminder that the cause and effect of the observed behaviors was not tested, and that only relationships have been established.

As can be seen from the tables which follow (Tables 75, 76, 77, and 78), behaviors that are conceptually related have been clustered and the behavioral patterns they contributed to have been identified. In keeping with the assumption that educational experiences influence more than just the immediate situation in which they occur, behaviors observed during both the semi-structured free-play (SSFP) and the structured block sorting activity (SSBST), and during both sessions (mother/child and father/child) were analyzed to determine their relationship to the children's block sorting task test (BST) scores.

Tables 75 and 76 indicate the coded behaviors and identified behavioral patterns of parents and their children, respectively, and indicate the relationship of these behaviors to the BST scores obtained after mothers taught the task (C/M BST scores). Tables 77 and 79 provide similar information for the behaviors related to scores obtained after fathers taught the task (C/F BST scores).

Table 75

Parent Behaviors Associated with Mother/Child Block Sorting Task Test Scores

Identified Pattern	Coded Behavior
Parents are less assertive especially mothers	- Proportion of moves contributed (M/SSFP) - Initiatory moves (M/SSFP/SBST, F/SSFP) - Initiates ET with solicitation (M/SSFP/SBT, F/SSFP/SBST) - Extra-logical moves (M/SSFP/SBST, F/SSFP/SBST) - Orders moves (M/SSFP/SBST, F/SBST)
Mother is more egalitarian during SSFP	+ Answers child (M/SSFP) - Initiates ETs (M/SSFP) - Parent monologues (Input ETs) (M/SSFP) + Mother/Child dialogues (Dyadic ET) (M/SSFP)
Father is more verbal	+ Mean words per move (F/SSFP/SBST) + Mean words per ET by F/C dyad (F/C/SSFP/SBST) - Not clear ETs by F/C dyad (F/C/SSFP/SBST)
Parents are more encouraging	+ Positive rating (M/SSFP/SBST, F/SSFP) + Positive rating & substantive feedback (M/SSFP/SBST)

Mother is less critical	- Negative rating (M/SSFP/SBST)
	- Negative rating & substantive feedback (M/SSFP)
Mother conveys more substantive content during SBST	+ References to substantive content (M/SBST)
	+ Requests or provides subst. info. (M/SBST)
	- References to substantive content (F/SBST)
Father conveys more instructional content during SBST	+ Requests or provides instr. info. (F/SBST)
	- References to instructional content (M/SBST)

Note. M=mother. F=father. C=child. SSFP=semi-structured free-play activity. SBST=structured block sorting task. +=positive correlation. -=negative correlation. $p < .05$.

Table 76

Child Behaviors Associated with Mother/Child Block Sorting

Task Test Scores

Identified Pattern	Coded Behavior
Child is assertive with mother during SSFP	+ Proportion of moves contributed (C/M/SSFP) + Initiatory moves (C/M/SSFP) + Initiates ET (C/M/SSFP) + Initiates ET with solicitation (C/M/SSFP)
Child is verbal	+ Mean words per move (C/M/SSFP/SBST, C/F/SSFP/SBST) - Nonverbal moves (C/M/SSFP)
Child is cooperative with mother especially during SBST	+ Child obeys orders (C/M/SBST) - Initiates ET with response[a] (C/M SSFP)
Child is less noncompliant	- Child overtly noncompliant (C/M/SSFP/SBST, C/F/SSFP)
Child provides diagnostic information to father	+ References to skills & Knowledge (C/F/SSFP)
Child conveys substantive content during SBST with mother	+ References to substantive content (C/M/SBST) + Substantively oriented ETs (C/M/SBST) + Combined content ETs (C/M/SSFP) + References to instructional content (C/M/SBST) - Combined content ETs (C/F/SBST)

Note. C/M=child with mother. C/F=child with father. SSFP=semi-structured free-play activity. SBST=structured block sorting task. +=positive correlation. -=negative correlation. $p < .05$.

[a]ET initiated by responses indicate child changed the topic of conversation.

Table 77

Parents' Behaviors Associated with Father/Child Block Sorting Task Test Scores

Identified Pattern	Coded Behavior
Parent are less assertive	- Proportion of moves contributed (M/SBST) - Initiatory moves (M/SSFP/SBST[a]) - Initiates ET with solicitation (M/SSFP) - Extra-logical moves (F/SSFP/SBST, M/SSFP/SBST) - Orders moves (F/SSFP[a]/SBST, M/SSFP/SBST)
Mother is more equalitarian	+ Answers child (M/SSFP) + Mother participates in ETs (M/SBST) + Mother/child dialogues (Dyadic ET) (M/SBST) + Mother/child Moderate ETs (M/SBST)
Parents are more verbal, especially mother	+ Mean words per ET by P/C dyads (F/SSFP, M/SSFP/SBST[a]) + No predominant content ETs[b] (M/SBST)
Parents are more encouraging, especially mother	+ Positive ratings (F/SBST[a], M/SBST) + Positive rating & substantive feedback (M/SSFP/SBST)
Mother is less critical	- Negative rating (M/SSFP) - Negative rating & Substantive feedback (M/SSFP)
Father conveys more instructional content during SSFP	+ Requests or provides instr. info. (F/SSFP) - References to substantive content (F/SSFP)
Father does more diagnostic probing during SSFP	+ References to child's skills & knowledge (F/SSFP)

Table 78

Child Behaviors Associated with Father/Child Block Sorting Task Test Scores

Identified Pattern	Coded Behavior
Child less interactive with mother during SBST	- Child monologues (C/M/SBST)
Child is cooperative with mother during SBST	+ Child obeys orders (C/M/SBST)
Child is less noncompliant	- Child overtly noncompliant (C/F/SSFP[a]/SBST, C/M/SBST[a])
Child provides diagnostic information during SSFP	+ References to skills & knowledge (C/F/SSFP, C/M/SSFP)
Child conveys less instructional content to mother during SBST	- Instructionally oriented EIs by C (C/M/SBST)

Note. C/M=child with mother. C/F=child with father. SSFP=semi-structured free-play activity. SBST=structured block sorting task. +=positive correlation. -=negative correlation. $p < .05$.
[a]Trend, $p < .06$.

As can be seen from the tables above the results of this correlational process-product study suggest that there are indeed "good matches" of parent/child behaviors and that certain combinations of mother, father, and child behaviors are more productive than others. In general mothers and their children seem to have had a more direct impact on the outcome of their M/C interactions (i.e., C/M BST scores), than fathers, or children with fathers had on their C/F BST scores. In fact, the M/C interactive behaviors, which had

Note. C=child. M=mother. F=father. P=parents. SSFP=semi-structured free-play activity. SBST=structured block sorting task. +=positive correlation. -=negative correlation. $p < .05$.

[a]Trend, $p < .06$)

[b]Syntactically and semantically complex ET.

occurred during the F/C interactions had more of an influence on the outcome of F/C interaction than the F/C interactive behaviors that had occurred immediately before the C/F BST test.

The compatability of the behaviors can be viewed from various perspectives to try to understand the various combinations of influences. To begin with there are patterns of behavior which seem to have been productive stategies regardless of who actually was the parent-teacher. For both parents a reduced level of assertiveness in the form of ordering their children to perform or prohibiting their actions was helpful. For mothers in particular "taking over" or "running" the interactions does not appear to have been helpful. When mothers behaved in a more egalitarian manner, sharing rather than dominating the dialogues and responding more to their children's questions, the children's scores after mothers, as well as, after fathers taught were higher. Parental encouragement and a less critical manner by mothers was also productively related to the scores children obtained after each parent taught them the task. In keeping with the content emphasis that differentiated parental styles, when fathers fulfilled their role by conveying more of the action and task related instructional content, children taught by both parents obtained higher scores. The verbal skills of parents and their children was also positively associated with higher

BST scores.

A few behaviors appear to have less generalized value. Fathers' use of diagnostic probes during the semi-structured activity to ascertain what their children could, or could not do, seems to have enhanced their C/F BST scores. Mothers' greater reliance on conveying substantive content was only beneficial when the task specifically required substantive knowledge.

The behaviors by children that were associated with better scores clearly suggested the importance of the child's capacity to reciprocate with their parents and to modulate their behaviors to accomodate to the requirements of the task at hand. For children, engaging in overtly noncompliant behavior such as refusals, oppositional behaviors, yelling, crying, etc., was a poor strategy that was associated with reduced success, regardless of which parent was being interacted with. Furthermore, higher C/M and C/F BST scores were positively associated with the level of children's cooperation with their mothers during the teaching of the structured task. It is understandable that parent-teachers would not function well with a child who refuses to participate during a teaching/learning interaction. It also seems clear that the child who is more cooperative with their mother in a specific context indicates more complex interactive skills. Not only is such a child willing to be cooperative, but he or she also knows when it really counts. One can assume that both parents would find such a child less difficult to teach.

Another productive strategy for children appears to be the capacity of the child to provide the parent with diagnostic feedback, particularly while the parent is not concentrating on teaching a specific task. A healthy sprinkling of "I don't know" or "I can't do that.", when they are not functioning as oppositional ploys, was associated with better scores.

Apparently it is interactively beneficial if children are somewhat assertive with their mothers during a relatively unstructured activity. This finding demonstrates how reciprocity may not always be the most educationally productive approach. Mothers, who appear to have a penchant for taking over, apparently do not do their best teaching with children who are not willing, or able to assert themselves and actively participate in the interaction. The reciprocal match of an assertive mother and a nonassertive child is not associated with the successful outcome of a structured teaching task. In the same manner mothers, who tended to be the more verbal parent, appear to have functioned most successfully when they were interacting with children who were also more verbal. The ideal reciprocal match of I talk, you listen does not turn out to be the most productive format for mothers and their preschool children. On the other hand, interactions with give and take, turn taking, sharing, and verbalizing what is happening were productively associated with the successful outcomes of the SBST task.

Content emphases, which differentiated mothers from fathers, appear to be a sort of role assignment in which parents have their distinct but complementary roles to perform and children have to accomodate to these roles. The scenario seems to run like this: mother does her bit as the major conveyor of substantive content during a structured task, father does not upsurp her role. Instead he performs his role as the major conveyor of the instructional content during the semi-structured activity. The children accomodate by sharing substantive information with their mothers during the structured task. When this three-way mix and match works, it is associated with higher C/M and C/F BST scores.

Parent-Teacher and Child-Learner: A Case of Reciprocity

For the most part the behaviors of parents toward their children seemed compatible with the behaviors and skills these children demonstrated. Parents and their children, to a remarkable degree, seemed unified in their preferences for verbal-logical behaviors and for topics of conversation. As can be seen from Tables 79 and 80, below, the rank order of the observed behaviors of parents and children, with only a few exceptions, are identical. Furthermore, the proportions of their behaviors that they alloted to each type of behavior or content reference were extremely close. The few exceptions that did occur generally reflected differences in the demands of their respective roles (e.g., parent-teachers do more questioning, child-learners do more answering) or developmental differences (e.g., parents, since they have attained a higher level of cognitive and linguistic skills, ask more tag questions and explain more than children do).

Table 79

Rank Order of Verbal-Logical Behaviors Observed during Parent/Child Teaching/Learning Interactions.

Parent Behavior		Child Behavior	
Linguistic Forms			
Soliciting	(44%)	Responding	(43%)
Reacting[t]	(40%)	Reacting[t]	(39%)
Structuring[t]	(9%)	Soliciting	(17%)
Responding	(7%)	Nonverbal	(16%)
Tag Question	(5%)	Structuring[u]	(2%)
Nonverbal	(1%)	Tag Question[t]	(1%)
Not Clear	(.25%)	Not Clear	(.25%)
Communicative Functions (Substantive Content)			
Providing or Requesting Information[t]	(39%)	Providing or Requesting Information	(34%)
Fact-stating[u]	(17%)	Fact-stating	(13%)
Defining[t]	(9%)	Defining	(10%)
Explaining	(3%)	Explaining[u]	(1%)
Communicative Functions (Instructional content)			
Providing or Requesting Information[t]	(35%)	Providing or Requesting Information[t]	(26%)
Fact-stating[u]	(15%)	Fact-stating[t]	(13%)
Opining	(15%)	Opining	(5%)
Explaining[t]	(3%)	Nonverbal Demo[u]	(5%)
Defining[u]	(1%)	Defining[t]	(1%)
Nonverbal Demo[t]	(1%)	Explaining[t]	(1%)

[t]tenuously reliable category.
[u]unreliable category.

Table 80

Rank Order of Content Emphasized by Parents and their Children During Teaching/Learning Interactions

Parent Behavior		Child Behavior	
Substantive Content			
Substantive Reference	(78%)	Substantive Reference	(70%)
Classification	(17%)	Classification	(16%)
Object Attribute[t]	(17%)	Object Attribute	(16%)
Spatial Relationship	(13%)	Spatial Relationship	(11%)
Representation	(8%)	Representation	(9%)
Numerical Relationship	(6%)	Numerical Relationship[t]	(5%)
Achievement	(3%)	Achievement	(3%)
Instructional Content			
Instructional References	(61%)	Instructional References	(73%)
Action/Procedure	(54%)	Action/Procedure	(49%)
Truth & Propriety of Statement	(14%)	Truth & Propriety of Statement[t]	(12%)
Material[v]	(8%)	Material[t]	(8%)
Cognitive Actions	(5%)	Cognitive Actions[t]	(4%)
Repeated Statement[n]	(3%)	Repeated Statement[n]	(3%)
Person[t]	(1%)	Person	(.53%)
Statement Altered[n]	(1%)	Statement Altered[n]	(.14%)
Statement Expanded[n]	(.77%)	Statement Expanded[n]	(.13%)

Parent EIs		Child EIs	
Instructional	(55%)	Instructional	(48%)
Substantive	(14%)	Substantive	(18%)
Not Predominant	(16%)	Combined	(9%)
Combined	(15%)	Not Predominant	(8%)
Not Clear	(.50%)	Not Clear	(1%)

[n]Inter-rater reliability not tested.
[t]tenuously reliable category.
[v]unreliable category.

The rank orders of the communicative functions and the substantive and instructional content that was discussed, as well as the family group difference that were revealed by this study, suggest that not only are parents and their children in agreement about how teaching/learning activities are to be enacted, but that the cognitive level and linguistic skills of the children were also being considered. It is not possible, given the results from this study, to determine whether parents were deliberately modifying their behaviors to meet their children's needs. However, it does appear that, just as studies have shown that mothers modify the linguistic input they provide their young language acquiring children (Gleason & Weintraub, 1979; Moerk, 1976; Newport, 1976; Shatz, 1979; Snow, 1977) so, during these teaching/learning interactions, mothers and fathers calibrated the verbal-logical behaviors they relied on and the content they emphasized to match their children's cognitive and linguistic development.

The implications of ch a finding are serious for studies that have in the past compared groups of mothers, whose children had different levels of cognitive or linguistic skills, and concluded from the differences in mothers' behaviors that the children's deficits were encouraged by the behaviors of these mothers of the lower functioning children. If parents do indeed try to match their teaching behaviors to their children's learning capabilities, than differences between groups of parents whose children test out as having even minimally different functional levels, (i.e., SES comparisons) may actually indicate the use of adequate and reciprocally valid parental teaching styles.

Different Children Are Not So Different

When one looks at the quantity of behaviors exhibited by parents and their children, there were relatively few differences between children from the three family groups. For the most part the participation of parents and their children was comparable. Those differences which were revealed were generally directly influenced by the levels of cognitive and linguistic skills that the children possessed.

It seems likely that the parents of DDB recognized that their children children lacked some of the essential skills necessary for demonstrating that the prescribed block sorting task had been successfully mastered and even for attending to and appropriately using the toy materials. Therefore, as has been suggested by previous studies (Cunningham et al., 1981; Dolley, 1974; Kogan, Wimberger, & Bobbitt, 1969; Kogan & Tyler, 1973), they used some strategies for teaching their children which were different from those used by parents of NDC or NDB. In general, it appears that because the parents of DDB assumed their children could not perform adequately and because their children did not perform in ways that would have contradicted that assumption, DDB received less cognitive and linguistic stimulation and less encouragement. In addition, their parents, particularly their mothers, taught in a more intrusive manner.

In terms of cognitive stimulation, parents of DDB, like their children, provided and requested less information about the topics they were discussing than parents and normally developing children did. In addition, parents of DDB did not provide as many positive ratings with substantive feedback. During the SSFP activity, parent/DDB dyads relied more on defining than on fact-stating or explaining. However, during the SBST activity, while parents of NDG and NDB increased their defining behavior to insure that their children could explain the classification criteria when they were tested, parent/DDB dyads decreased their defining behavior. Furthermore, during the SBST activity parents of NDG and NDB and their children all dramatically increased their references to those content areas that were relevant to the prescribed task. Parents of DDB and their children, not only increased their references to classification far less, but also increased their references to topics that were less directly relevant for understanding or performing the task (e.g., spatial relationships). Parents of NDG and NDB, just like the middle-class mothers of normally functioning children that Brophy (1970) observed, seem to have provided more specific substantive and task related information to their children, a stategy which appears to have been productive, at least for mothers.

Since the overall proportion of references to substantive and instructional content did not vary as a function of family groups and since during the SSFP activity parents uttered more references to DDB about substantive content than parents of NDC did, it appears that the task related specificity is what was lacking rather than substantive information in general. It is possible that when parents of special child n feel the pressure of having immediately to accomplish a teaching/learning task with their children, they are less effective in imparting information than when they are under less of a time constraint.

In any case the ability of parents to provide sufficient relevant information to their children during the teaching of a specific task ought to be explored further. If indeed it were confirmed that parents of special children offer less rather than more specifics to their children that would be a fruitful area for providing them with new insights and skills for teaching their children.

Since it took the DDB longer to learn the block sorting task and they were less successful in mastering it, parent/DDB dyads emitted more moves and engaged in more ETs.

However, the proportion of moves or of ET participation for parents of children from each of the family groups were not significantly different from one another. In response to their children's poorer performances and reluctance to cooperate, parents of DDB did emit more negative ratings than parents of NDB or NDG did.

In keeping with the delay in DDB's expressive language skills, they and their parents used less words per move and per ET, engaged in more unclear ETs, and initiated more ETs with unclear moves. Developmentally delayed boys repeated more of their parents' statements than NDG or NDB did, a language learning stratgegy that has been related to lower levels of language functioning (Nelson, 1973). The parents of DDB referred to the truth or propriety of their children's statements less often then parents of NDG or NDB did, but since they did not repeat, expand, or alter the statements their children made any more frequently than the parents of NDC did, it appears that they were not deliberately trying to improve their children's language skills.

Parents of DDB intruded on their children by asking them a great many more questions and by giving them many more orders. It seems likely that the abundance of questions directed towards DDB represent parents' efforts to maintain and encourage their children's attention rather than to obtain information. Furthermore, the more frequent reliance on monologues by mothers of DDB suggests that they were making a special effort to fill the verbal vacuum that often exists during interactions with language delayed children. These interpretations are in keeping with observations by Snow (1977) that mothers interacting with young children who are not adequate conversational partners use a great deal of redundancy and a high frequencies of questions, and with Bridges' (1979) suggestion that adults impose conversational constraints (e.g., more direct rather than indirect, directives) in order to maintain ongoing interactions with their young children (2 year olds).

Since parents of DDB gave them more orders they had more opportunities to obey or disobey than NDG or NDB had. As a result DDB complied somewhat more often than NDG or NDB, although this differences was not significant. The higher proportion of noncompliance that DDB demonstrated was significantly more than the minimal amounts that NDG and especially NDB demonstrated. Looking more closely at these results, and calculating the ratio of compliance or noncompliance by children to the orders their parents emitted, revealed that the activity had an influence on these behaviors. During the SBST activity the DDB were the most disobedient, they also received the most orders. The NDG, who also disobeyed somewhat, were given more orders than the NDB, though not nearly as many as the DDB. The

NDB, given the challenge of a cognitive task in a structured context, cooperated the most and demonstrated virtually no noncompliant behavior during that task. A finding which should be of interest to anyone concerned with planning curriculums for preschool children, particularly since preschool boys are often regarded as more restless and less cooperative than preschool girls.

Since increases in parents' direct ordering were associated with lower BST scores, it appears that there may be some optimal level of direct ordering, which if exceeded distracts from the real objectives of the task at hand. Parents of DDB need to be made aware of the amount of compliant behaviors their children are indeed exhibiting and need to be encouraged to experiment with some of the more indirect forms of uttering directives that have recently been specified (Erwin-Tripp, 1976) and that have been observed during mother/toddler interactions (Schaffer & Cook, 1979).

One could also make a case for the fact that noncompliant behavior by DDB, which appears to be diametrically opposed to the efforts of parents really represent the child's efforts to, within the limits of their own developmentally delayed skills, master assertive behaviors. As it appears from the results presented, the strategy of using assertive behaviors is a productive one for children, especially in interacting with their mothers. The problem for DDB is that they have not yet mastered some of the skills needed to demonstrate assertivesness in more acceptable ways (e.g., initiating dialogues, offering alternatives to the activity suggested), and they are either not aware of the need, or do not know how to modulate thei behavior when the context of the activity requires it. Therefore, they and their parents are engaged in a conflictual dialectic relationship. The resolution for such interactions seems to depend on whether parents can be helped to understand the underlying dynamics of these interactions and on whetner their children can be helped to master other, more positively regarded, assertive behaviors.

Although generally there were few differences between the NDG and NDB dyads those few deserve to be mentioned. It was expected that the girls would demonstrate the greater verbal facility that is generally mentioned in the literature; however, any clear verbal advantage for girls was not evident from the behaviors observed for this study.

The content areas that NDG and NDB dyads concentrated on during the SSFP acitvity did conform to certain usual stereotypes. The parents and their NDB did discuss spatial relationships, and actions or procedures far more frequently than parents and their NDG did. On the other hand, during the SSFP activity NDG dyads and DDB dyads discussed the letters of the alphabet and other forms of representation more than the NDB dyads did. During the SBST activity NDG and their parents spoke more frequently about the various aspects of classification task they were engaged in, a behavior which apparently was not associated with greater success on the BST test.

The NDB made more references to what they did or did not know, a technique which appears to provide parents with important diagnostic feedback.

Context Counts

A major contention of this study was that teaching/learning interactions could only be understood when the context in which they were viewed was considered. As it turned out the most important aspect of the total context of the observations was the activity being engaged in and the degree to which the objectives of that activity had been prescribed. The impact of the activity on the behaviors of all the participants was far more pervasive than the sex or developmental status of the children or the sex/role of their parents.

A quick perusal of Table 81 indicates that during the structured block sorting task parents became more assertive, less egalitarian, more verbal, and more demanding of their children. Although F/C dyads generally favored briefer transaction, this was particularly so during the more structured activity. Parents also made more use of tag question which seem to function as attentional markers and diagnostic probes. Children reciprocated to the changes in their parents' behaviors during the structured task by initiating and verbalizing less, but responding and complying more. Interestingly enough, children's overtly noncompliant behavior also increased as parents' demands increased.

Clearly when the content that had to be covered in order to accomplish a task was prescribed, parents and their children focused in on the relevant content areas and spent less effort on developing linguistic skills or discussing non-task related instructional issues.

Table 81

Changes in Parent and Child Behavior during Two

Educational Activities

SSFP	Observed Behaviors	SBST
less	% of moves by Parent	more
more	% of moves by Child	less
less	Mean # words per move by Parent	more
less	Mean # of words per ET by Parent	more
more	Mean # of words per move by Child	less
more	Mean # of words per ET by Child	less
more	Nonverbal moves by Parent	less
less	Nonverbal moves by Child	more
more	Not Clear moves by Child	less
less	Initiatory moves by Parent	more
less	ETs initiated by Parent	more
more	Initiatory moves by Child	less
more	ETs initiated by Child	less
more	Soliciting by Child with Mother	less
less	Tag Question by Parent	more
more	Reactive moves by Parent	less
less	Reactive moves by Child (espec. with Mother)	more
more	Responding moves by Parent	less
less	Responding moves by Child	more
less	NDB respond to Mothers solicitations	more
less	Orders by Parent	more
more	Orders by Child	less
more	Compliance moves by Parent[t]	less
less	Compliance moves by Child[t]	more
less	Noncompliance moves by Child	more
more	Moderate ETs (4 to 7 moves) by P/C dyads	less

Note. The was a significant main effect for Activity for all behaviors listed in this table ($p < .05$). SSFP = semi-structured free-play. SBST = structured block sorting task. ETs = educational transaction sequences. NDB = normally developing boys.
[t]tenuously reliable

Although none of the results indicated in Table 81 seem very surprising, there is little evidence that the planning of curriculums for preschool children, or for training their parents as their teachers, takes advantage of these obviously manipulable behaviors in order to further their goals or objectives. For example, it seems that if a program has as an objective increasing the language skills of children, an objective of most programs for special children clearly support, then the use of prescribed structured tasks would not be advisable, Narrowly circumscribed tasks would also not be productive for teaching children to initiate interactions or for reducing their noncompliant behaviors. On the other hand, if the communication of specific content is to be emphasized, or parents are to be encouraged to be more assertive with their children, then more highly structured tasks would be suitable.

Obviously programmatic choices are generally not clear and simple. Instead they require a thoughtful balancing and orchestration of the particular skills and needs of family members with the hopes and promises of intervention programs. It does seem, however, that in designing programs for benefiting families attention should be paid to how the activities being recommended will support behaviors that are compatible with short-term program objectives as well as long-term goals.

On a methodological note, it is apparent that studies of parent/child interactions must consider the impact of the activities they ask participants to engage in before interpreting their results. In general, the use of a variety of activities whose prescribed demands vary is essential for an adequate understanding of the range of behaviors that parents and their children make use of. However if the behavioral data that is collected during several activities is combined for analysis purposes the results obtained could be misleading.

Summary

That mothers and even fathers can, do, and should be involved in teaching their own children was an assumption which motivated this study. The goal was to observe, describe, and compare how each parent taught their own preschooler and to investigate how the structure of the task before them, the sex and/or developmental level of the child, and the sex/role of the parent influenced their teaching/learning interactions. In addition, it was hoped that it could be demonstrated that the instrumentation used for these observations was a viable system that could be used not only for further research, but also for evaluation purposes.

These observations of parent/child teaching/learning interactions indicate that, for the most part, the behaviors of parents towards their children seemed to be compatible with the behaviors and skills these children demonstrated. Furthermore, the stylistic variations that seemed to differentiate the teaching style and content emphases of mothers and fathers during the two educationally oriented activities were often complementary and directly or indirectly related to the scores their children obtained after they had been taught a block sorting task.

The parent/child observations undertaken for this study, suggest that the education children obtain from their parents, although more directly influenced by mother/child interactions, are, nevertheless, also influenced by father/child interactions. Furthermore, given the opportunity, fathers can teach their preschool children, and they bring to such teaching/learning interactions certain stylistic variations which could enrich the total educational experience that is provided in children's homes.

The results from this study also indicate that the context of the interactions, i.e., the type of activity being engaged in and the explicit and implicit objectives that motivate such interactions, have a pervasive influence on the behaviors exhibited and on the outcome on these interactions.

The Columbia Instrument (Bellack et al., 1966), which was modified somewhat for use in this study, needs additional modifications in order to improve the inter-rater reliability for coding certain categories. Although it is a time consuming and complex coding system, it does appear to be suitable for use as a parent/child interaction research and evaluation tool, particularly when content and cognitive behaviors are of interest.

Conclusion

Fostering maximal, adequate parent/child teaching/learning interactions depends on the recognition that not only do parents need to learn how to modify some of their behaviors, but that children also need to be trained to do their share to insure that such interactions will be educationally productive and interpersonally enjoyable.

Programs designed to include parents in the enterprise of educating their own children ought to be taking advantage of all of the resources that are available to support and enhance the goals they are working towards. Certainly fathers represent a heretofore untapped resource that could be productively involved in the education of preschool children. A more careful consideration of the impact of the activities planned for parent/child dyads, as well as teacher/child dyads, would also be helpful.

When they are interpreting parent/child interactions researchers and program evaluators have to take a less value laden look at parent/child interactions. Before they can evaluate the appropriateness, or the inappropriateness, of parental teaching behaviors they must consider the match between the child's behaviors and skills, the parent' behaviors and skills, the types of activities engaged in, and the objectives and goals of educational experiences.

The results of this study and of the literature reviewed suggests that parents, especially those who have children who have developmental delays or are educationally handicapped, need to be made aware that heavy doses of behaviors that are not verbal-logical (e.g., giving orders) are not educationally productive. Parents also need to be alerted to the strengths their children possess. The parents of developmentally delayed boys need to be helped to recognize that their children are frequently complying and that the noncompliant behaviors which can be so irritating can be modified not only by behavior modification techniques but also by carefully orchestrating how directives are communicated. Experimentation with the use of indirect forms of issuing orders may provide these parents with means of asserting themselves vis-a-vis their children without having to resort to the use of overt controlling and directing behaviors. Helping parents of delayed children to time their requests to coincide more with their children's attention and interests and to provide their children with more positive comments, particularly in conjunction with substantive feedback, appear to be promising techniques for these parents to learn.

In addition it is important to encourage children, especially children with special needs, to maintain ongoing parent/child interactions, to utilize assertive and initiating behaviors, as well as to be able to modulate these behaiors to conform to the demands of particular situations. Normally developing and developmentally delayed children also need to be trained to provide accurate diagnostic information to their parents, so that when they do indicate that they can not do something, their parents can reevaluate how they should proceed.

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APPENDIX A

Summary of the Columbia Instrument[1]

(1) SPEAKER: Indicates source of utterance

Mother (M): Father (F): Child (C):

(2) TYPE OF PEDAGOGICAL MOVE: reference to function of move.

Initiatory Moves

Structuring (STR): sets context for subsequent behavior by launching or halting-excluding interaction

Soliciting (SOL): directly elicits verbal, physical, or mental response; coded in terms of response expected

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[1] Source: Arno A. Bellack, Herbert M. Kliebard, Ronald T. Hyman, and Frank L. Smith, Jr. The Language of the Classroom (New York: Teachers College Press. 1966) pp. 38-40.

Reflexive Moves

<u>Responding</u> (RES): fulfills expectation of solicitation: bears a reciprocal relationship to solicitation

<u>Reacting</u> (REA): modifies (by clarifying, synthesizing, expanding) and/or rates (positively or negatively): occasioned by previous move, but not directly elicited: reactions to more than one previous move coded REA

<u>Not Codable</u> (NOC): function uncertain cause tape is unaudible

(3) SUBSTANTIVE MEANING: reference to subject matter topic...

(4) SUBSTANTIVE-LOGICAL MEANING: reference to cognitive process involved in dealing with the subject matter under study

Analytic Process: Proposed use of language or established rules of logic

<u>Defining-General</u> (DEF): defining characteristics of class or term with example of items within class explicity given

<u>Defining-Denotative</u> (DED): object referent of term

<u>Defining-Connotative</u> (DEC): defining characteristics of class or term

<u>Interpreting</u> (INT): verbal equivalent of a statement, slogan, aphorism, or proverb

Empirical Process: sense experience as criterion of truth

<u>Fact Stating</u> (FAC): what is, was, or will be without explanation or evaluation; account, report, description, statement of event or state of affairs.

<u>Explaining</u> (XPL): relation between objects, events, principles; conditional inference; cause-effect; explicit comparison-contrast; statement of principles, theories or laws

Evaluative Process: set of criteria or value system as basis for verification

<u>Opining</u> (OPN): personal values for statement of policy, judgement or evaluation of event, idea, state of affairs; direct and indirect evaluation included

<u>Justifying</u> (JUS): reasons or argument for or

against opinion or judgement

(5) NUMBER OF LINES IN 3 AND 4 ABOVE...

(6) INSTRUCTIONAL MEANINGS: reference to factors related to classroom management

Material (MAT): teaching aids and instructional devices

Person (PER): person as physical object or personal experiences

Procedure (PRC): a plan of activities or a course of action

Statement (STA): verbal utterance, particularly the meaning, validity, truth or propriety of an utterance

Logical Process (LOG): function of language or rule of logic; reference to definitions or arguments, but not presentation of such

Action-General (ACT): performance (vocal, non-vocal, cognitive, or emotional) the specific nature of which is uncertain or complex

Action-Vocal (ACV): physical qualities of vocal action

Action-Physical (ACP): physical movement or process

Action-Cognitive (ACC): cognitive process, but not the language or logic of a specific utterance: thinking, knowing, understanding, listening

Action-Emotional (ACE): emotion or feeling, but not expression of attitude or value

Language Mechanics (LAM): the rules of grammar and/or usage

(7) INSTRUCTIONAL-LOGICAL MEANING: reference to cognitive processes related to the distinctly didactic verbal moves in the instructional situation

Analytic Process: see (4) above

Defining-General (DEF)

Defining-Denotative (DED)

Defining-Connotative (DEC)

Interpreting (INT)

Empirical Process: see (4) above

Fact Stating (FAC)

Explaining (XPL)

Evaluative Process

Opining: (OPN): see (4) above

Justifying (JUS): see (4) above

Rating: reference to metacommunication usually an evaluative reaction (REA)

Positive (POS): distinctly affirmative evaluation

Admitting (ADM): mild or equivocally positive evaluation

Repeating (RPT): implicit positive evaluation when statement (STA) is repeated by another speaker; also for SOL to repeat vocal action (ACV)

Qualifying (QAL): explicit reservation stated in evaluation; exception

Not Admitting (NAD): evaluation which rejects by stating the contrary; direct refutation or correction excluded

Negative (NEG): distinctly negative evaluation

Positive/Negative (PON): SOL requesting positive or negative evaluation

Admitting/Not Admitting (AON): SOL asking to permit or not permit procedure or action

Extralogical Process: SOL expecting physical action or when logical nature of verbal response cannot be determined

<u>Performing</u> (PRF): asking, demanding, explicit directive or imperative

<u>Directing</u> (DIF): SOL with or without stated alternatives: asking for directive, not permission for specific action

<u>Extra-logical Process not Clear</u> (NCL): extra-logical process involved not clear

(8) NUMBER OF LINES IN 6 AND 7 ABOVE

Each pedagogical move is coded as follows:

(1) / (2) / (3) / (4) / (5) / (6) / (7) / (8)

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(1) Speaker

(2) Type of Pedagogical Move

(3) Substantive Meaning

(4) Substantive-Logical Meaning

(5) Number of Typescript Lines in (3) and (4)

(6) Instructional Meaning

(7) Instructional-Logical Meaning

(8) Number of Typescript Lines in (6) and (7)

Descriptions of and Rationales for Modifications of the Columbia Instrument

Modifications of the pedagogical move facet.

Since part of our sample consisted of children whose expressive language development was delayed, we were particularly concerned about any possible nonverbally expressed moves. Although we did have video tapes of our observations we did not routinely use them for coding as Neujahr (1976) had done. Therefore his modification for coding the presentation mode of pedagogical moves (e.g. speaking, gesturing, writing, etc.) could not be adopted. Instead subscripts were added to the pedogogical move codes in order to indicate : (1) when a move had been clearly nonverbal, or (2) when a verbal move had been incomprehensible due to poor articulation or to the incomplete or inaccurate syntax of the utterance. Had we not added these subscripts, the reciprocity of the interactions between the developmentally delayed children and their parents would have been greatly distorted.

In 1977 we learned of some ongoing research which was similar in some ways to our own endeavors (Weintraub, note 2). The initial reports of that research (Gleason & Weintraub, 1979) indicated that their measurement of tag questions, i.e. questions which follow statement and ask for some form of confirmation (e.g. That's a nice game, isn't it?), had been productive in demonstrating differences between the verbal behavior of mothers and fathers. In addition we were aware that tag questions by children could be utilized as an indication of the development of their language acquisitions skills (Cazden, 1972; Brown & Hanlon, 1964). Since this study focuses on describing and comparing parents as teachers of normally developing and differentially developing children, and on the interactions between the observed behaviors of these parents and their children, it was decided to further modify the coding of the pedagogical move facet by adding a subcategory, for coding the occurrances of tag questions, under the major category of "soliciting".

Modifications of the substantive meanings facet.

As opposed to teacher/pupil interactions, the subject matter that parent/child dyads referred to could not be narrowly defined in academic terms. Therefore, we found it necessary to develop our own categories for coding the subtantive topics being discussed. Using a Piagetian framework as a theoretical foundation (Piaget, 1952, 1955, 1962) categories were created which reflected ideas that had been assimilated while reading Brown (1973), Edwards (1973), Flavell (1963) Kamii (1971,1972), Kamii and DeVries (1977), Kamii and Radin (1968), and Yarrow et al. (1968/1973). All of these researchers had been influenced by Piaget, were concerned with children's cognitive development, and with the specific concepts and skills that young children acquire and can express. The substantive meanings categories of the observation system used to investigate parent/child interactions were specifically developed for this study. Hopefuly they will prove useful for other studies that are focusing attention on the development of younger children in non-academic situations. (See System of Analysis, chapter 2 for categories and operational definitions.)

Modifications of the substantive-logical meanings facet.

Eight logical meaning subcategories which described the communicative functions of moves, are provided in the original Columbia Instrument. These behavioral subcategories are classified as manifestations of either analytic, empirical, or evaluative cognitive processes. If the topic referred to in a move is substantive, then one of the eight logical meaning categories describes the communicative function associated with that substantive content. Under the original system these functions were coded as the associated "substantive-logical meaning". If the content of a move is instructional (i.e., has "instructional meaning"), then one of these same eight logical meaning categories is coded to accurately describe the "instructional-logical meaning" (i.e., the communicative function) of that move.

My experiences interacting with younger children in teaching situations led me to believe that parents and children would not only present content by defining, fact stating, explaining, etc. but would also use the technique of demonstration. Therefore, I added two subcategories for coding the communicative function of: (1) demonstrations that were accompanied by verbal expressions which elicited attention and/or provided information (e.g., "See this block is taller", "Now, I'm going to put the red block on top.") and (2) demonstrations that were accompanied by no verbalizations or by verbalizations that only elicited attention (e.g., "Now watch this."). These behavioral subcategories were labeled verbally demonstrating and nonverbally demonstrating respectively. Both of these subcategories were classified under the "empirical process" category.

In order to efficiently input data on tapes via the computer it was necessary to eliminate some of the subcategories that rarely occurred and/or that could easily be subsumed under broader and more frequently occuring major categories. For this reason, although the actual coding procedure did utilize all of the logical-meaning categories from the original Columbia Instrument, for the recorded computerized data "denotative" and "conotative" defining were not itemized as separate subcategories, nor was the rarely occurring "interpreting" subcategory. All three are recorded as examples of an "analytic process" and considered as instances the communicative function of defining in a general sense. Justifications which did not involve explanations were extremely rare and therefore were entered with opinions as instances of evaluative processes.

In addition to the modifications just described further changes were made in the "instructional-logical meanings" and "extra-logical meanings" facets. These alterations and additions are described in the appropriate sections below.

Modifications of the instructional-meanings facet.

Although all of the original "instructional meanings" categories were retained for the actual coding of the data certain additions and modifications were introduced. Research on early language acquisition has focused heavily on the issue of how language is acquired (Brown, 1973; Chomsky, 1972; Edwards, 1973; McNeill, 1970; Piaget, 1955; Vygotsky, 1934/1962). Researchers have debated and investigated whether parents teach children language indirectly through modeling speech for the child and through modifying their own speech to accomodate to the cognitive development of their children, or whether they teach language more directly by expanding and correcting children's utterances (Brown & Bellugi, 1964; Berko-Gleason, 1977; Cazden, 1972; Lewis & Freedle, 1973; Nelson, Carskaddon, & Bonvillian, 1973; Newport, Gleitman & Gleitman, 1977; Phillips, 1973; Snow, 1972). In 1964 Brown and Bellugi suggested that children's early repetitions of mother's utterances were systematic transformation reductions that reflected constraints on length that were similar to children's constraints for all intellectual operations during the stage of development they observed (C.A. one to two). They indicated that reduced repetitions by children are a source for extracting certain of the syntactical awarenesses children already possess. In addition, they suggested that expansion transformations by mothers could be regarded as a parental technique that has the potential to be an effective teaching strategy for promoting children's awareness of certain syntactic and semantic aspects of the language they are learning. Cazden (1972) had tried to demonstrate the effectiveness of adult expansions of children's utterances through a controlled experiment; however, her effort was not successful. Although Newport, Gleitman, and Gleitman (1977) and Nelson (1973) have demonstrated some relationships between adult expansions and certain aspects of children's language acquisition, there is still no clear documentation of precisely how parental expansions affect children's language acquistion (Brown, 1973). Furthermore the possible relationship of repetions, expansions, and alterations to the cognitive knowledge acquired by young children has not been systematically investigated. It appears that these linguistic behaviors could be useful as teaching/learning techniques; and that furthermore, efforts to describe and compare their occurance during parent/child interactions would prove enlightening. Therefore, I added some subscripts to the category for coding references that are made to previous statements (STA). These subscripts are used to indicate when a speaker's move consists of: (1) a repetition of the other speaker's utterance, (2) an expansion with a repetition of the other speaker's utterance, or (3) a rewording of the other speaker's utterance which alters the meaning of that utterance. Table 82 presents some examples of these categories and their apparent functions.

Table 82

Some Examples of Repetitions, Expansions, and Alterations Of Statements Occurring During Parent/Child Interactions and Their Apparent Functions

Repetitions with and without reductions	Apparent Function
(referring to colored strips of clay) C: Strips. M: Strips.	An exact repetition which implicitly confirms the pronounciation and meaning of a statement.
F: What color? C: Dah reh. F: Red. Red. C: Reh.	A repetition which models correct pronounciation and implicitly confirms the meaning of a statement.

M: Fill in the yellow ones. C: Fill in.	A reduced repetition accompaning compliance with an action directive.
C: Dat yahloah. F: Yellow, oaky.	A repetition which models correct pronounciation and explicitly confirms the meaning of the statement.
C: Here's a pyramid. M: A pyramid? C: Yeah.	A repetition that asks for confirmation of the accuracy of the statement as it was understood.
M: We need these things. C: Yeah, we need.	A reduced repetition that explicitly confirms the accuracy of the meaning of the statement.
F: Now, what's this here? C: Here.	A reduced echolalic repetitions.

Expansions

C: Two boats F: Yeah, there's two boats, right	An expansion which models more complete syntactical structure and explicitly confirms the accuracy of the meaning of the statement.
M: Don't you want to make something? C: Yeah. A house. M: You wanta make a house? C: Yeah.	An expansion which models more complete syntactical structure and asks for confirmation of the accuracy of the statement as it was understood.
C: Rectangle. M: A rectangle.	An expansion which models more complete syntactical structure and implicitly confirms, the meaning of the statement.

Alterations

F: What do you wants play with? What have we got here? C: Play. (pause) Toys. F: Yeah, they got a bunch of toys here.	An alteration with an explicit confirmation and additional meaning provided.
C: (referring to picture in	An alteration to correct

	a book)	and model vocabulary.
F:	Ah yeah. Teapot or a kettle.	
C:	A kettle.	
C:	Red light means slow.	An alteration to correct meaning and an implicit negative rating.
F:	Red light means stop.	
C:	(referring to a pile of blocks) They don't get to fall off.	An alteration to correct and model syntactical structure and an explicit confirmation of the meaning of a negatively phrased statement.
M:	No, they won't fall off.	

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As is apparent from the table above, repetitions, expansions, and alterations of other speaker's statements have a variety of apparent functions. It appears that these references to speaker's previous statements all function on two levels. On the first level they provide immediate linguistic reinforcement, one participant gets to hear all or part of what they just said repeated while the other participant gets to practice the utterance by repeating it. On another level these behaviors provide syntactic and semantic feedback by implicitly or explicitly agreeing or disagreeing with the statement being referred to.

Since there was only one instance of specific references to "language mechanics" (out of the 26,295 moves) and no reference to "logical process" these categories were eliminated when the data entry system was programmed.

References to "action-vocal" and "action-emotional" were relatively infrequent and therefore, for data entry purposes, coded instances were subsumed under the "action-general" category. Although there were relatively few references to "action-cognitive" we did include it as a separate category when we entered our data. Since our focus is on behaviors that may relate to cognitive development we felt that any references to cognitive processing per se might prove of interest.

The category of "assignments" was not relevant in the context of our study and therefore it was not utilized.

It became apparent, during the coding phase, of this investigation, that discriminating between the categories of "action-physical" and "procedure" was problematic and often arbitrary since moves frequently combined a specific reference to a physical action with a procedural fact (e.g, "So, I give them to you?"). Therefore although we did try to code these as separate categories and included them both in our data entry system, we combined them for the reliability study because they were to be combined for the actual analysis of the data.

Modifications of the instructional-logical meanings facet.

As was previously mentioned (see modifications of substantive-logical meanings section), categories for coding all forms of defining and interpreting were entered in the computer as instances of an "analytic process". Justifications which did not include explanations were included with opinions as an instance of an "evaluative process". Requests for a positive or negative evaluation were also considered instances of opining. Two subcategories for coding nonverbal and verbal demonstrations were added to the set of subcategories which were subsumed under the "empirical process" category.

Initially we had followed the original rating categories and coded instances of both mildly positive ratings of "admitting," and "repeating". We had also coded mildly negative ratings as "not admitting", and ratings which indicated reservations as "qualifying". Although they had both used these categories for coding, Bellack et al. (1966) and Neujahr (1976) had reported that these categories were relatively rare. For purposes of analysis they had both collapsed the larger set of rating categories into two more comprehensive subcategories called positive and negative ratings. Following their example, and to simplify the data entry process and the analysis of our data, we recorded coded instances of "positive", "admitting", or "repeating" ratings as positive ratings, and instances of "negative", "not admitting", and "qualifying" ratings as negative ratings. A subcategory was added for coding evaluatory reactions and responses that were neither positive nor negative and it was labeled neutral ratings (e.g. "oh", "is that so").

<u>Modifications of the extra-logical meanings facet</u>.

Two extra-logical meaning categories were included as a subset of the instructional-logical meanings facet in the original instrument. In coding the extra-logical meaning of moves I found that Neujahr's (1976) expansion of this section of the instrument was essential for accurately reflecting the behaviors observed when parents interacted with their preschoolers. Furthermore, I believe that the behavioral categories which he added are particularly relevant when the interactions being observed involve developmentally delayed children or toddlers. The coding categories incorporated from Neujahr were "permitting a performance", "prohibiting a performance" "prescribing a repetition", "seeking permission", "compliance", offering an "alternative", and "non-compliance". The original two categories of "performing" and "directing" which were provided for in the <u>Columbia Instrument</u> (Bellack et al., 1966) were retained: however, we found Neujahr's operational definitions more useful and therefore relied on those in the final draft of the coding system that was utilized for this study.

During the coding phase it became apparent that two more categories for infrequently occurring, but nevertheless meaningful behaviors, were necessary; therefore, two categories were added; one for coding "teasing" or "joking" behavior, and one for coding "word play".

Modifications of Teaching Cycles

Bellack et al. (1966) have developed a construct they called "teaching cycles". These cycles are determined by combining sequences of pedagogical moves according to prescribed rules. "A teaching cycle begins either with a structuring move or with a soliciting move that is not preceded by a structuring move. A cycle ends with a move that precedes a new cycle" (p.19). Using this procedure, 21 types of teaching cycles are identifed: twelve of these are initiated by structuring moves and nine are initiated by soliciting moves.

Initially the plan for this study was to follow Bellack et al.'s procedures and to describe and compare the teaching cycles that occurred when parents taught their children. Two problems developed which made this original plan seem ill advised. To begin with, the inter-rater reliability study (see Methods and Procedures chapter) demonstrated that structuring moves were only tenuously reliably coded for parents and were unreliably coded for children. Under these circumstances, using structuring moves to determine the boundaries of teaching cycles seemed unjustifiable. Furthermore, a perusal of the actual data and some preliminary efforts to parse the moves into teaching cycles emphasized the fact that the construct of teaching cycles was logically related to the game analogy that Bellack et al. had adopted from Wittgenstein. The game analogy focuses attention on uncovering discourse rules and on determining the roles of the players. From the beginning, the game analogy had not been very appealing to me and as I reviewed the actual typescripts and the teaching cycles that could be established it became increasingly clear that, while this system for chunking moves into larger sequences was feasible, it did not do justice to the underlying dynamics of the interactions. Using teaching cycles insured that parents would be described as predominantly enacting the initiatory role because they made a larger proportions of the moves, particularly the structuring and soliciting moves. For a game analogy this preponderant behavior could be considered as indicative of player roles and the relative power and control that was being exerted by each player. In reality however, within the context of parent/child dyadic interactions, structuring and soliciting moves did not necessarily initiate shifts in the focus of the dialogues.

My interest in the facilitation of cognitive development during teaching interactions turned my attention to the impact of the content that was being discussed by the parent/child dyads. It became clear that sequences of moves could also be logically separated by considering the shifts in the content areas that are being discussed. Frequently the shifts in the content area under discussion are not initiated by structuring or soliciting moves; instead a reacting or a responding move could, deliberately or accidentally, redirect the discussion and focus it on a different content area. For example, a parent might be explaining the attributes of an object and in doing so ask the child to identify a particular attribute. The child might not respond as expected, but instead offer information about the object's owner, its location in space, etc. In fact the child might not respond to the question at all and instead might comment on some other aspect of the ongoing dyadic interaction. In both cases the parent would generally, at least temporarily, engage in a dialogue about the new content area that the child had introduced. If teaching cycles are considered as the unit of analysis such an interactional pattern would be credited as a totally parent initiated cycle. On the other hand, if the content area shift concept was utilized to determine the sequential patterns of the dyadic i teraction, then the child's contribution, although coded as a responding or a reacting move, would be credited as initiating a new content bound cycle.

Preliminary efforts to compare the actual sequential patterns determined by teaching cycles and by a content shift approach, using the actual data that had been collected, indicated that many of the boundries would be the same. When the boundries differed, the content area shifts procedure provided a more accurate reflection of the roles of the players in determining the cognitively oriented aspects of the dialogue; the teaching cycles approach provided a more accurate reflection of overt efforts to control the interactions, particularly when parents were interacting with their developmentally delayed youngsters. Two examples of dialogue are provided to demonstrate and contrast each of the approaches for determining the sequential patterns that occurred during an educationally oriented activity.

Example 1

Teaching Cycle #1   Content Shift #1   Coding

M: You know what this looks like to me?   M/SOL/SYM/DEF/-/-/08

Teaching Cycle #2

C: What?   C/SOL/SYM/DEF/-/-/01

M: An airport with air tower control, air traffic control building.   M/RES/SYM/DEF/-/-/10

C: Right.   C/REA/SYM/-/STA/POS/01

Teaching Cycle #3   Content Shift #2

C: Why don't you put something in here, and like, like this one.   C/STR/DOG/DEM/ACP/PRF/11

M: That's very good.   M/REA/DOG/-/ACP/POS/04

Teaching Cycle #4

C: Kay now you get in there and put something different. C/SOL/DOG/-/ACP/PRF/10

M: Alright. M/RES/DOG/-/ACP/CPL/01

C: Okay. C/REA/DOG/-/ACP/POS/01

Content Shift #3

M: Let's see, if you put two together of these triangles we get a square. M/REA/OAG/FAC/ACP/DEM/15

C: Yup. C/REA/OAG/-/STA/POS/01

M: Blue and white, M/REA/OAG/FAC/-/-/03

Teaching Cycle #5

M: Right? M/SOL-T/OAG/-/STA/PON/01

C: Yup. C/RES/OAG/-/STA/POS/01

Example 2

Teaching Cycle #1 Content Shift #1 Coding

F: What's that, clay? F/SOL/OAG/DED/STA/PON/04

C: Yeah. C/RES/OAG/-/-/STA/POS/01

Teaching Cycle #2 Content Shift #2

F: Well, what do you wanna make? F/SOL/REP/DEF/PRC/DIR/06

Content shift #3

C: Uh. (pause) Got these all at school. C/REA/SOR/-/MAT/FAC/05

Teaching Cycle #3

F: Well, why don't you play with those? F/SOL/-/-/MAT/PRF/08

Content Shift #4

C: There's a lot. C/REA/NOS/FAC/MAT/-/04

F: I know there's a lot. F/REA/NOS/-/STA-R/POS/06

Since determining teaching cycles was largely dependent on the coding of structuring moves, (which had not been found to be adequately reliable), and because they did not adequately reflect the cognitively oriented aspects of the dialogues, the plan to analyze the data in terms of teaching cycles was abandoned. Instead a new procedure for determining sequential patterns in the interactions was developed and the sequential patterns isolated by this procedure were labeled _educational transactions_. A computer program based on a rule system for analyzing content shifts was developed so that sequential patterns could be determined through the use of the computer program.[1]

Bellack et al. had used two types of teaching cycles for their analysis. In order to determine the "possible patterns for pedagogical moves and how they are distributed in the data" (p.193), they first considered teaching cycles in terms of their formal order. They stated that "formally ordered teaching cycles... represent a logical reconstruction of the discourse rather than a recapitulation of the precise order in which the pedagogical moves were made" (Bellack et al., 1966, p.197). In some instances responses and reactions did not immediately follow solicitations or structurings, but did refer back to them

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[1] I am deeply indebted to Jack Davis, Coordinator of technical support, of the Center for Social Inquiry, at the University of Connecticut, at Storrs for developing the computer program that made this analysis possible.

after another complete cycle had intervened. In order to maintain the integrity of the first temporally aborted cycle, the initiatory moves and the subsequent, though not directly suceeding reactive moves were considered as one cycle, and the intervening cycle was considered as a separate cycle. Strict adherence to temporal order was relinquished in order to preserve the logical structure of the verbal interchange. The rate, source, and types of patterns of these formally ordered teaching cycles were then analyzed.

The second approach that Bellack and his associates utilized was based on the temporal order of the teaching cycles. This was done so that a Markov chain procedure could be used to determine the probabilities that certain types of teaching cycles might influence the type of teaching cycles that immediately followed them. "Temporally ordered teaching cycles" (p.204), like the formally ordered teaching cycles, needed some modifiying so that certain embedded minor cycles could be included within the larger cyclical patterns. Bellack et al. referred to these instances as "augmented cycles" (p.205). The three minor cycles that were incorporated within the augmented temporally ordered teaching cycles were: (1) cycles which solicited a repetition, (2) cycles which directed a performance. and (3) cycles whose function was to clarify or expand the larger cycle. These temporally ordered cycles were then sequentially analyzed through the use of a Markov matrix for each of three dimensions: (1) who initiated the cycles, (2) "the type of logical meaning of the soliciting move within the cycle" (p.211), and (3) the type of cycle pattern, out of the 21 possible teaching cycles that could occur.

Problems with minor cycles that should logically be included within the larger cyclical patterns were also encountered in the data collected for this study, and therefore, two of the augmentation rules developed by Bellack et al. were included in the computer program that parsed the educational transactions. Embedded minor cycles were be incorporated into the larger content bound cycles if they: (1) functioned to elicit a repetition or (2) functioned to direct a performance. This second rule was further modified in order to make it possible to include, along with a "directing a performance" move, any "nonverbal demonstrations", "evalutions", or relevant "extra-logical process" moves that immediately followed the directing of the performance move. For example, a parent might first explain the goals or method for performing a task, then ask the child to perform the task, and then either ask the child to agree to perform, or reprimand the child for not performing the task. The latter two parent moves and the child's responding moves would be coded as not having substantive meaning, and therefore, would appear to represent a new cycle. Since the parental request to perform, the child's agreement, or refusal, to perform, and/or the parents' rating of the child's behavior are all moves embedded in the context of directing a performance, they are treated as an embedded minor cycle that augments a larger cycle.

Special instances which required that the augmentation rules be applied to educational transactions rule were relatively rare in the data collected for this study. This finding is in keeping with the report by Bellack et al. that augmented teaching cycles occurred infrequently in their data. It appears that in the future these special instances of embedded minor cycles could be taken into account by introducing certain modifications in the procedures for coding at the move level. and that the rules for augmented or embedded cycles could then be ommitted.

Below are two brief examples of the use of the special rules for incorporating certain minor cycles within larger cyclical patterns.

Example 1: A cycle with an embedded asking for a repetition cycle.

F:	Well? Now what...? Do you notice something different?	F/SOL/OAG/FAC/ACP/PON/09
C:	What?	.C/SOL/-/-/STR/AGN/01
F:	Uho. what's different about the blocks you added?	F/SOL/OAG/FAC/-/-/08

C: Longs, long. Long, long. long. (child is pointing to blocks) C/RES/OAG/DEF/-/-/02

Example 2: A directing a performance cycle with an embedded asking for and receiving agreement to perform cycle.

M: Now, let's put this in one, and we'll try and find others that match it. Okay? M/STR/COR/-/PRC/FAC/17 M/SOL-T/-/-/PRC/PON/01

C: Alright. C/RES/-/-/PRC/POS/01

After the educational transactions (ET) had been established, they were analyzed to determine the relative proportions of transactions in terms of: (1) who initiated the ET, (2) how many moves were included in the ET, and (3) what was the predominant type of content that was referred to in the ET. (For a complete description of how the content orientation and duration of educational transactions was determined see section on Educational Transactions in Methods and Procedures, chapter 3.)

Modifications of number of lines.

Children in the preschool age group observed for this study tend to produce relatively sparce verbal utterances. Bellack et al. (1966) coded the number of typescripted lines per move and used this measure for making certain quantitative comparisons. Since almost all of the children's moves were "one liners" this form of measuring the quantity of language would have been misleading, and made it impossible to compare the complexity or quantity of language which the children produced. Therefore I chose to count the actual number of words spoken and to make quantitative comparisons based on the average number of words per move (MLM), a construct which is basically analagous to the mean number of words per utterance (MLU). The MLU is a measure generally considered to be useful for estimating children's language development (Brown, 1973; Çazden, 1972). (The rule system we utilized for counting words was essentially the same as that used by Gleason and Weintraub (note 2) and can be found in Appendix B.)

APPENDIX B

SYSTEM FOR THE ANALYSIS OF PARENT/CHILD INTERACTIONS

Selecting an Appropriate Observation System

An observation system that would be appropriate for use in this study had to focus on the cognitive dimensions of teacher/learner behaviors. The selection of the system was guided by specific criteria and was the final result of a previously undertaken comprehensive survey of available observation systems (Kahn,1976). Taking the admonitions of critics of previously conducted observation studies to heart (Dunkin & Biddle, 1974; Rosenshine & Furst, 1973), it was decided to utilize an instrument whose reliability and valid y had been established. To minimize the difficulties frequently encountered in observational studies the instrument selected had to be suitable for coding all the observed verbal behaviors in mutually exclusive categories that required only limited inferences by the coders (Dunkin & Biddle, 1974; Herbert & Attridge, 1975; Medley & Mitzel, 1963). In addition the coded data had to be recorded in a form that would be approprate for the interactive and sequential analyses that were planned. In order to facilitate future replications and longitudinal comparisons the instrument had to be suitable for use with various age groups and in a variety of educational situations. The relationships that were to be explored were complex and the observations that were going to be made had not previously been made in a similar manner. Since there was no body of research from which to extract the salient observable behaviors it was necessary to select a fairly comprehensive system that could subsequently be simplified for practical applications (Hyman, 1974; Karnes & Teska, 1975). With these criteria in mind the Columbia Instrument (Bellack, Kliebard, Hyman, and Smith, 1966) was selected.

The Columbia Instrument was developed to code the verbal behaviors of teachers and pupils in secondary schools while they were pursuing a specific subject area. It has been replicated in various countries, with different age groups who were studying a variety of subjects under varying educational circumstances (Lundgren, 1972; Powell, 1971; Neujahr, 1976; Bellack, note 1). The reported reliability of the instrument is high and process-product relationships have been successfully investigated. Using the data collected by Bellack and his associates, Furst (1967) demonstrated that certain of the observed teacher behaviors were related to the pupil achievement measures. In addition Neujahr (1976) found that the behaviors he observed in different classrooms were related to the subject matter, and to the structure and goals of the lessons he had observed.

An Overview of the Columbia Instrument

The conceptualization of Bellack's observation system was heavily influenced by the philosophy of language espoused by Wittgenstein (1958) in his later writings. Wittgenstein developed a "game" metaphor because the "language game", as he viewed it, had in common with all games the fact that its form and structure was dependent upon the context in which it was occurring and on the function it was to serve. He viewed language games as consisting of the words and accompanying actions that are a part of a particular communicative effort (Malcolm, 1967). Wittgenstein (1958) had stated that the meaning of sentences could only be comprehended by describing their "use". For Wittgenstein it was only in context that meaning could be derived.[1]

In keeping with these philosophical ideas, Bellack et al. (1966) conceptualized the linguistic discourse occurring in classrooms as a particular type of language game. He and his associates developed their observation system, The Columbia Instrument, to classify the observed discourse so that the rules and player roles for the classroom language game can be specified.

[1] This same perspective has been supported by the research of Lois Bloom (1970) and is presently acknowledged by most researchers who are investigating early language acquisition (Brown, 1973).

For The Columbia Instrument, the "pedagogical move" is the basic unit of analysis. Each pedagogical move consists of one or more utterances by a speaker, categorized in terms of its linguistic form. The linguistic form of each "pedagogical move" is classified as being either "...structuring, soliciting, responding, or reacting." The subject matter or content of each move is further classified in terms of its: (1) "substantive meaning" (i.e., the subject matter or substantive content that is being referred to), (2) "substantive-logical meaning" (i.e, the communicative function of any move that explicitly refers to substantive content, (3) "instructional meaning" (i.e., references to nonsubstantive content such as the management, assignments, or procedures of the class or its individual members), and (4) "instructional-logical meaning" (i.e., the communicative function of any move that explicitly refer to instructional content).

Bellack et al. (1966) also investigated sequences of pedagogical moves. They identified 21 different sequential patterns, which they labelled "teaching cycles". These cycles were then analyzed to determine : (1) the rate of cycles (i.e., the number of cycles per minute), (2) the initiator of the cycles, and (3) the types of cycles, (i.e.,

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[1] Arno A. Bellack, Herbert M Kliebard, Ronald T. Hyman, and Frank L. Smith, Jr. The Language of the Classroom (New York: Teachers College Press, 1966) pp. 15,16,22.

the sequential pattern of moves within and between cycles).

In order to clarify the facets and the individual categories that Bellack et al. (1966) developed, their summary of The *Columbia Instrument* is provided in Appendix A together with the descriptions of and rationales for the modifications of *The Columbia Instrument* that were introduced for this study.

The *Columbia Instrument* (Bellack et al., 1966) had not been used with preschoolers nor had it been used to observe dyadic interactions outside of classroom settings, therefore certain modifications seemed appropriate. Some modifications had already been made by Neujahr (1976) for his observations of 6th graders in classrooms where individualized instruction was occurring. The final version of the observation system that was utilized for this study, includes some of the changes that had been made by Neujahr, and some categories that I developed for this study. (The modifications of each facet of *The Columbia Instrument* and the rationales for these changes are provided in Appendix A). A description of the actual observation system used for coding parent/child interactions and a summary of that system is presented below.

The Modified System of Analysis

Below is a complete description of the operational definitions used to code the data from parent/child interactions. Specific examples from the data are provided as a means of clarification. The majority of these definitions are taken verbatim from the original Columbia Instrument. Where modifications introduced by Neujahr were incorporated they are quoted directly from his work. The remaining additions and modifications, which are discussed in Appendix A, are my own. The coding procedures used and the results of our reliability study are reported in the Methods and Procedures chapter (chapter four) and in the Results chapter (chapter five). Coding instructions can be found in Appendix C.

Each move was coded for each of the following facets:

1. Emitter of the move
2. Linguistic form of pedagogical move
3. Substantive meaning
4. Substantive-logical meaning
5. Instructional meaning
6. Instructional-logical meaning
7. Number of words in move

The Emitter

The emitter of the verbal expressions to be coded was indicated on the typescript of the interaction. The accuracy of the transcribers decision had been verified when the typescript were reviewed (see coding procedures). Emitters were either Mothers[1] (M). or Fathers (F). or Children (C). Each typescript of an interaction was coded numerically to indicate the family identification number. the parent's sex. and the child's sex. Later for analysis purposes interactions with boys were separated from interactions with girls and from interactions with developmentally delayed boys.

Linguistic Forms of Pedagogical Moves

"Pedagogical moves. the basic units of classroom discourse. describe the verbal activities of teachers and pupils...[during dyadic interactions]. There are four basic types of moves which characterize the verbal interplay of...[parents and their children]: structuring and soliciting, which are initiatory moves; and responding and reacting, which are reflexive moves."[2]

The presentation mode of a move may be verbal or nonverbal. In order to provide an accurate description of the reciprocal interactions that occurred when parents teach

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[1] underlining indicates the coding terminology used in actually coding. letters in parenthesis indicate the coding abbreviations.

[2] Bellack. et al., The Language of the Classroom, pp. 16,17.

their children I used two subscripts to indicate when a move was nonverbal or noncomprehensible.

(1) "Structuring (STR). Structuring moves serve the function of setting the context for subsequent behavior by (1) l··unching or halting-excluding interactions... ·ween parents and children , and (2) indicating the natur· the interaction in terms of the dimensions of time. agent, activity. topic and cognitive process, regulations. reasons, and instructional aids. A structuring move may set the context for the entire...game or a part of the game.

"Since structuring moves set the context for subsequent behavior or performance, they are pivotal points in...[dyadic] discourse. They convey an implicit directive by launching...discussion in specified directions and by focusing on topics. subjects or problems to be discussed, or procedures to be followed.

"Structuring moves do not elicit a response. are not in themselves direct responses. and are not called out by anything in the immediate... [dyadic interactions] except the speaker's concept of what should be said or taught."[1]

Examples from dyadic interactions. Coding

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[1] Ibid.. pp.16,17.

Ex. 1

C:	I think we oughta play with the next game.	C/STR/-/-/PRC/OPN/09

Ex. 2

M:	It's time for- we hafta do a different game now. Ruthie wants me to show you how to play a special game.	M/STR/-/-/PRC/FAC/22

Ex. 3

F:	O.K., now Daddy'll do it. You teach Daddy.	F/STR/-/-/PRC/PRF/09

Ex. 4

F:	When you roll the dice whatever number dots come up that's how many red checkers you take off. And then when I'll roll the dice and however many dots come up, that's the number of black checkers I'll take off. And we'll see who can get all of the checkers off first.	F/STR/NUM/-/PRC/XPL/57

(2) "Soliciting (SOL). Moves in this category are intended to elicit (a) an active verbal response on the part of the persons addressed; (b) a cognitive response, e.g., encouraging persons addressed to attend to something; or (c) a physical response.

"Soliciting moves are clearly directive in intent and function.... Although these moves may take all grammatical forms--declarative, interrogative, and imperative--the interogative occurs most frequently. In coding soliciting moves, the various categories of analysis are coded in terms of the response expected rather than the solicitation itself."[1]

<u>Examples from dyadic interactions</u>. <u>Coding</u>

Ex. 1

C:	You want to make a house with these blocks, a big house?	M/SOL/OAZ/-/PRC/PON/12

Ex. 2

F:	You tell me what the letters were.	F/SOL/LSG/DED/-/-/07

Ex. 3

C:	What, what is this, what is this called?	C/SOL/OAN/DED/-/-/08

Ex. 4

M:	Don't fool now. I want you to really think about this. Okay?	M/SOL/-/-/ACT/PRF/13

(2.1) <u>Tag Questions</u> (SOL-T): Under the rules for coding established by Bellack et al. (1966) tag questions would have been considered a solicitations if the speaker paused and seemed to expect a response. If the speaker answered their own tag questions or did not pause it would have been coded as a reaction (REA) to a lack of responsiveness. For our study we wanted to differentiate tag questions from the remaining solicitations and therefore we coded tag questions as solicitations but subscripted them with a T. When a tag questions was included in, or immediately followed a solicitation the tag question was not

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[1] Ibid., p. 18.

coded separately nor considered a true tag question (see last example above and example 4 below).

Examples from dyadic interactions.		Coding
Ex. 1		
M:	This is the best way to do it. Let me show you. You take, you start out with a lot at the bottom. Okay?	M/STR/DOT/XPL/ACP/DEM/23 M/SOL-T/DOT/-/ACP/PON/01
Ex. 2		
F:	Just a little different, isn't it.	F/REA/COR/FAC/-/-/04 F/SOL-T/COR/-/STA/PON/03
Ex. 3		
C:	Now that looks pretty, doesn't it?	C/REA/-/-/ACP/OPN/04 C/SOL-T/-/-/ACP/PON/03
Ex. 4		
F:	Put an 'N' over here. Okay?	F/SOL/LSG/-/ACP/PRF/06

(3) "Responding (RES). Responding moves bear a reciprocal relationship to soliciting moves and occur only in relation to them. Their pedagoggical function is to fulfill the expectation of soliciting moves and is therefore reflexive in nature. Since solicitations and responses are defined in relationship to each other, there can be no solicitation that is not intended to elicit a response, and no response that has not been directly elicited by a solicitation."[1] A solicitation may however be ignored. or the person who was solicitated may chose to make a move that, because it is not relevant to the solicitation nor

directly responsive to it, is not coded as a response (RES). Occassionally responses do not immediately follow solicitations, but when encountered are clearly related to a solicitation that occurred previously. The move is still considered a response even though one or more intervening moves may have occurred.

Examples from dyadic interactions. Coding

Ex. 1

F:	Want to try to make one of these pictures?	F/SOL/SYM/-/ACP/DIR/09
C:	Which one?	C/SOL/SYM/-/MAT/DIR/02
F:	Which one do you like? Do you like the elephant?	F/SOL/SYM/OPN/MAT/PON/10
C:	Yeah.	C/RES/SYM/-/MAT/POS/01

Ex. 2

M:	Find one that's yellow	M/SOL/OAC/DNV/ACP/PRF/05
C:	This one's yellow.	C/RES/OAC/DED/ACP/CPL/04

Ex. 3

M:	Can you put a roof on?	M/SOL/ACH/FAC/ACP/DNV/06
C:		C/RES-NV/ACH/-/ACP/DNV/00
M:	Careful!	M/REA/ACH/-/ACP/NEG/01

(4) "Reacting (REA). These moves are occasioned by a structuring, soliciting, responding, or a prior reacting move, but are not directly elicited by them. Pedagogically, these moves serve to modify (by clarifying, synthesizing, or

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[1] Ibid., p. 18.

expanding) and/or to rate positively or negatively what was said or done in the move(s) that occasioned them. Reacting moves differ from responding moves: while a responding move is always directly elicited by a solicitation, __preceding moves serve only as the occasion for reactions.__"[1]

"The postscript -P is added to the coding of reactions (i.e.,REA-P) when the reaction is occasioned by a physical action rather than a verbal action."[2]

__Examples from dyadic interactions.__		__Coding__
__Ex. 1__		
M:	Woops, everything's falling down.	M/REA-P/MOV/FAC/-/-/05
__Ex. 2__		
F:	How old is that?	F/SOL/NOS/FAC/-/-/04
C:	One, two, three.	C/RES/NUM/DED/-/-/03
F:	That's right.	F/REA/NUM/-/STA/POS/03
C:	I used to be that old, but now I'm four.	C/REA/NOS/FAC/-/-/11

(5) "__Not codable__ ((NOC). Pedagogical function is uncertain because the tape is inaudible"[3]

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[1] Ibid., pp. 18,19.

[2] Ibid., p. 259.

[3] James l. Neujahr. __The Individualized Instruction Game__ (New York: Teachers College Press, 1976), p.12.

Subscripts for pedagogical move types.

Nonverbal (NV). Since coding did not routinely involve the use of video tapes many nonverbal moves could not be recognized. In order to minimize coder inferences, only those nonverbal moves that were clearly reacted to by the other member of the dyad were coded as nonverbal. Solicitations, responses, and reactions could be coded as nonverbal; however, nonverbal structuring moves could never be inferred from subsequent reactions. If video tapes had been used for coding, then actions such as the nonverbal placement of materials in order to begin a task, or to end it, could have been considered as nonverbal forms of a structuring move. The following two dialogues provide examples of nonverbal moves.

Examples from dyadic interactions.		Coding
Ex. 1		
M:	Okay, and then you show me the pictures as you read.	M/SOL/SYM/-/PRC/PRF/11
C:	Now what is this?	C/SOL/SYM/DED/-/-/04
C:	What do you do with the paint?	C/SOL/OAF/FAC/-/-/07
M:	That's a paint brush.	M/RES/SYM/DED/-/-/04
C:		C/SOL-NV/SYM/DED/-/-/00
M:	That's a horn.	M/RES/SYM/DED/-/-/04
Ex. 2		
F:	There, we gotta give it a point.	F/REA/DOT/-/ACP/FAC/07

F: Put the point over there.	F/SOL/DOT/-ACP/PRF/05
C:	C/RES-NV/DOT/-/ACP/CPL/00
F: That's it. Okay!	F/REA/DOT/-ACP/POS/04

Noncomprehensible (NCP). Children who are developmentally delayed usually have some delay in their expressive language capabilities; nevertheless, they often can and do participate in dialogues. In order to capture the quantity of their participation it was necessary to include a subscript (NCP) which indicated that although neither the observer/coder nor the other member of the dyad, as inferred from their reaction, had understood what the child had said, the child had indeed attempted to interact verbally. The following three dialogues provided examples of noncomprehensible moves by the children.

Examples from dyadic interactions	Coding
Ex. 1	
M: Let's try to match 'em.	M/STR/COR/-/PRC/FAC/06
C: Bu, I haf.	C/REA-NCP/-/-/-/-/00
M: Look. Look, look, he's sad.	M/SOL/SOR/FAC/ACT/PRF/05
Ex. 2	
M: Oh what is it? Looks like...	M/SOL/SYM/DED/-/-/06
C: Uhn, Uh-uh-pundle. Ah, ah rahbu.	C/RES-NCP/SYM/NCL/-/-/00
M: What is it?	M/SOL/SYM/DED/-/-/03
Ex. 3	

F:	There's four different kinds of shapes. Some are round. Some are square. Okay!	F/REA/OAP/DEC/-/-13 F/SOL-I/OAP/-/STA/PON/01
C:	Ahh de ah.	C/RES-NCP/-/-/STA/NCL/00
F:	This is what? That round?	F/SOL/OAP/DEC/STA/PON/05
C:	Deeyaaah. [Tone of voice and father's reaction indicated that child was trying to say yes]	C/RES/OAP/-/STA/POS/01
F:	That's not round. No, that's square.	F/REA/OAP/DEC/STA/NAD/08

Adults as well as well as children occasionally mispronnounce words or garble their word order in such a way that their move cannot be comprenended by the observer/coder or the other member of the dyad. Such moves were also coded NCP.

The subscript for a noncomprehensible move more accurately reflected the reciprocity of the interactions between developmentally delayed preschoolers and their parents and also indicated when non-comprehensible moves were made by adults. Prosodic features and parental responses were used to determine the pedagogical move type. If however, one member of the dyad indicated they had understood the previous speaker's move, then that move was not coded NCP.

As was true with the nonverbal subscript, only solicitations, responses, or reactions could be inferred from audio typescripts. Structuring moves could probably have been coded if video tapes had been used for coding.

The Categories Of Meaning

The content and communicative functions that parents and their children express when they are engaged in an educationally oriented situation can be coded in terms of "four functionally different types of meaning...: substantive with associated substantive-logical meanings; and instructional with associated instructional-logical meanings. Within each pedagogical move these four types of meaning are identified when they appear in the discourse and are coded ...[in accordance with the coding instructions described in Appendix C.][1]

Substantive meaning categories.

"Substantive meanings are coded for those moves or segments of moves in which one is communicating subject matter or soliciting another to communicate certain subject matter. Communications about the subject matter--for example, whether it is hard or easy, whether one understands it or not, and assignments associated with it--are considered to have instructional meaning since they do not

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[1] Bellack et al, *The Language of the Classroom*, pp. 20,21.

contribute directly to the... [child's or parent's] knowledge of the subject nor do they call upon the...[child or parent] to use or demonstrate the knowledge he [or she] has on the subject."[2]

For this particular study the substantive content being coded was not confined to a particular academic area. Instead the substantive content was considered to be those areas of knowledge that a Piagetian model of cognitive development indicates preschool children must master before they can successfully perform concrete operations. The categories that were created for our study were developed with the intent of reflecting long term outcome goals which are consistent with a presch 1 curriculum that relies on a Piagetian model of development. The categories defined below represent extrapolations from the work of Brown (1973), Edwards (1973), Flavell (1963), Kamii (1971-1972), Kamii and DeVries (1977), Kamii and Radin (1968), Piaget (1962-1952, 1955, 1962, 1970, 1977/1965), and Yarrow et al. (1966/1973).

(1.) Socio-emotional Knowledge (SEK). General discussion of the nature of social interactions, their meaning and their appropriateness. Socio-emotional

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[2] James J. Neujahr, The Individualized Instruction Game (New York: Teachers College Press, 1976), P. 14.

knowledge is derived from feedback from people. It includes references to motivation, to behavioral controls, to acceptable behavior, and to culturally determined values and practises.

(1.1) Interaction Within the Dyad (SED). Direct references to the parent/child relationship or interaction processes they have had, are having, or will engage in.

Examples from dyadic interactions.	Coding
Ex. 1	
M: I'll, I'll help you.	M/ EA/SED/-/PRC/FAC/04
Ex. 2	
C: Please help Mommy.	C/SOL/SED/-/PRC/PRF/03

(1.2) Interaction With Others (SEO). Direct references to relationships or interactive processes with other adults, peers, or siblings.

Examples from dyadic interactions.	Coding
Ex. 1	
F: Maybe I'll get you a kit like this so you can make sister a necklace, and that could be your present to her.	F/REA/SEO/XPL/PRC/FAC/24
Ex. 2	
M: Did you play with these with Daddy?	M/SOL/SEO/-/MAT/FAC/07
Ex. 3	

F: Boy, we haven't seen Tony for a long time. F/REA/SEO/FAC/-/-/10

(1.3) Decorum and Manners (BHV). Reference to acceptable behavior in social settings.

Example from dyadic interaction. Coding

M: Cover your mouth, please. M/SOL/BHV/-/ACP/PRF/04

(1.4) Achievement Motivation and Pride in Mastery (ACH). References to initiative, to persistence, to exploratory efforts, or curiosity which includes some implied or explicitly stated standards. References to capacities to master, pride in mastery, or to the inability to master are also coded ACH.

Examples from dyadic interactions. Coding

Ex. 1

M: These are easy to pull out when you're trying hard. M/REA/ACH/FAC/ACP/OPN/11

Ex. 2

C: I never done that. C/RES/ACH/FAC/-/-/04

Ex. 3

F: You have to try harder. F/REA/ACH/FAC/ACP/PRF/05

Ex. 4

C: I did it! C/REA/ACH/FAC/1/ACP/POS/03

Ex. 5

C: I can't make it tach. C/REA/ACH/FAC/ACP/FAC/06

(2) Physical Knowledge (PHK). References to

physical phenomena, to the physical attributes of objects or people, to actions involving objects or people, or the state or condition of objects or people.

(2.1) Object Attributes (OAG). Direct reference to an object(s) and/or the properties or characteristics of an object(s). Code OAG if more than one attribute is cited.

Example from dyadic interaction		Coding
M:	You got to put these circles, these little pegs that you see underneath. They have little feet like that fits down in the holes	M/REA/OAG/DEM/ACP/XPL/24

(2.11) Color (OAC). Reference to the color of object(s) is the main focus of the move.

Examples from dyadic interactions.		Coding
Ex. 1		
M:	What color? What color?	M/SOL/OAC/DEC/-/-/02
C:	Reh.	C/RES/OAC/DEC/-/-/01
M:	Red?	M/SOL/OAC/-/STA-R/PON/01
C:	Mahmee. Reh.	C/RES/OAC/-/STA-R/POS/02
Ex. 2		
C:	Red. That's my favorite color	C/REA/OAC/XPL/-/-/06

(2.12) Size (OAZ). Reference to the size of object(s) is the main focus of the move.

Examples from dyadic interaction		Coding
Ex. 1		
M:	We want all the big ones.	M/STR/OAZ/FAC/-/-/06
Ex. 2		
M:	It's too little.	M/REA/OAZ/FAC/-/-/04
Ex. 3		
C:	Is it as big as the Empire State Building?	C/SOL/OAZ/OPN/-/-/09

(2.13) Name or label (OAN). Use of object(s) name or request for object(s) name, when naming the object is the main focus of the move.

Examples from dyadic interactions.		Coding
Ex. 1		
F:	Because that's a, that's called a one-way mirror.	F/RES/OAN/DED/-/-/11
Ex. 2		
C:	What, what is this, what is this called?	C/SOL/OAN/-/MAT/DED/04
F:	That's a jigsaw puzzle.	F/RES/OAN/-/MAT/DED/05

(2.14) Shape (OAP). Reference to the shape of object(s) is the main focus of the move.

Example from dyadic interaction		Coding
Ex. 1		
C:	This one?	C/SOL/OAP/-/MAT/PON/02
M:	Yep. see they're, they're the same shape--two rectangles	M/RES/OAP/FAC/MAT/PCS/09

Ex. 2

F: That's a corner. F/REA/OAP/DED/-/-/04

(2.15) Height (OAH). Reference to height of object(s) is the main focus of the move.

Example from dyadic interaction	Coding
Ex. 1	
M: They're all the same height	M/REA/OAH/FAC/-/-/06
Ex. 2	
F: Yeah, but it's not the same height.	F/REA/OAH/FAC/ACP/QAL/08

(2.16) Weight (OAW). Reference to the weight of object(s) is the main focus of the move.

(2.17) Volume (OAV). Reference to the volume of object(s) is the main focus of the move.

(2.18) Texture (OAT). Reference to the texture of object(s).

Example from dyadic interaction	Coding
C: That soft? [referring to clay]	C/SOL/OAT/OPN/-/-/02
F: No, it's still hard. But we'll warm it up.	F/RES/OAT/OPN/ACP/FAC/11

(2.19) Temperature (OAR). Reference to the temperature of object(s).

(2.110) Function or use (OAF). References to use or function of object(s) is the main focus of the move.

Example from dyadic interaction	Coding
C: What are these things for?	C/SOL/OAF/FAC/MAT/-/05
F: Those are dice.	F/RES/OAN/-/MAT/DED/03
C: Well, what are they for?	C/SOL/OAF/FAC/MAT/-/05

(2.111) Sound (OAS): Reference to sound of object(s).

(2.2) Action-Object Relationships (DOG). Reference to actions done to, or by objects or animate beings. These actions may be occurring in the present, may have occurred in the past, or may be anticipated. Reference may or may not be based on actual experiences. If more than one type of action is cited or if the type of action is not clearly specified code as DOG.

(2.21) Action on or With Objects (DOT). Reference to agent instigated action on another object or being. May involved the use of body parts or other instruments to affect the other object or being.

Examples from dyadic interactions.	Coding
Ex. 1	
C: Do it with my finger like this.	C/REA/DOT/DEM/-/-/07

Ex. 2

C: Daddy? Is this? C/SOL/DOT/-/ACP/PON/03

F: Yeah. Just turn it until it fits, doll. F/RES/DOT/XPL/ACP/POS/08

(2.22) Action of Object (MOV). Reference to an action performed by an animate being or an inanimate object, or to an action which an object or animate being could perform but which does not involve efforts to act on another object or being. Pretending or reports of fantasized feats are considered representational and are coded as symbolic (see SYM).

Examples from dyadic interactions. Coding

Ex. 1

C: Ooo, it fell and split in half. C/REA-P/MOV/XPL/-/-/06

Ex. 2

M: ...don't get down. Don't get down! M/SOL/MOV/-/ACP/PRO/05

Ex. 3

F: Whoops. They're falling out the side here. F/REA-P/MOV/FAC/-/-/08

(2.3) State-Object Relationships (SOR). General references to the specific state or condition of objects or animate beings, or to changes in the state or condition of objects or animate beings. If more than one specific state-object relationship is discussed, code SOR.

reference to spatial relationships of objects or beings, or between objects and beings. If more than one specific spatial relationship is cited code SPS.

Example from dyadic interaction	Coding
Ex. 1	
F: Does it fit?	F/SOL/SPS/OPN/-/-/03
It's too big for the box,	F/REA/SPS/FAC/-/-/07
isn't it?	F/SOL-I/SPS/-/STA/PON/03
Ex 2	
F: The one with the straight line, this is the side of the thing.	F/STR/SPS/DED/-/-/13

(2.331) Position (WHR). Reference to spatial relations in terms of position or placement of objects or beings, or the relationship of the spatial position or placement between objects or beings.

Examples from dyadic interactions.	Coding
Ex. 1	
C: They go in the middle.	C/REA/WHR/FAC/-/-/05
Ex. 2	
F: Okay, you put that one on the top. See if you can get it to face the right way.	F/SOL/SPS/DNV/ACP/PRF/19

(2.332) Location (LOC). Reference to a specific location, of an object or being without any references to the spatial relationships involved.

(2.31) Possessive (OWN). Reference to ownership, to possessing, or to giving to others to possess. Reference are coded OWN regardless of whether the claim of ownership is accurate or not.

Examples from dyadic interactions. Coding

Ex. 1

M: You never had those. Cheryl had these when she was a little girl. M/REA/OWN/FAC/MAT/-/13

Ex. 2

F: We can't take those dice. They're not ours to take. F/REA/OWN/XPL/ACP/NEG/12

(2.32) Experiential (EXP). References to mental states, physical experiences, reactions, perceptions, or cognitions that are internally experienced; phenomenological experiences that may or may not be observed or inferred by others.

Examples from dyadic interactions. Coding

Ex. 1

M: You sleepy? M/SOL/EXP/FAC/-/-/02

Ex. 2

M: [Referring to child's cough] You swallowed some saliva down the wrong pipe? M/SOL/EXP/-/STA/POS/08

C: Yes. I swallowed some heavy snot down the wrong pipe. C/RES/EXP/FAC/STA-A/POS/10

(2.33) Spatial Relationships (SPS). General

Examples from dyadic interactions.	Coding
Ex. 1	
C: Where does this go?	C/SOL/LOC/FAC/-/-/04
Ex. 2	
M: Let's put'em over here.	M/STR/LOC/DHV/PRC/FAC/06

(2.333) Direction (WAY). Reference to the direction in which objects or beings move or are moved.

Example from dyadic interaction	Coding
[referring to checkers game]	
M: Upp. Can you move backwards? You have to go towards this side and I have to go toward that side, right?	M/SOL/WAY/-/PFC/PON/05 M/REA/WAY/DEM/PRC/FAC/15 M/SOL-T/WAY/-/STA/PON/01
C: And I have to fill that space.	C/RES/SPS/FAC/PRC/FAC/08

(2.34) Temporal Relationships (TIM). Reference to sequences of time, passage of time, or measurements of time. Also references to the sequencing of events or activities in a time frame.

Examples from dyadic interactions	Coding
Ex. 1	
F: We can play that later.	FRES/TIM/-/-/PRC/FAC/05
Ex. 2	
C: When are we going back?	C/SOL/TIM/FAC/-/-/05
M: In a little while.	M/RES/TIM/FAC/-/-/04

(2.35) Alteration of State (CHG). References to changes in attributes or states of objects or people. Alterations of state may or may not be the result of observed actions or experiences.

Example	Coding
C: Bro in	C/REA-P/CHG/FAC/NAT/-/01
M: No, try again, it's not broken.	M/REA/CHG/FAC/STA/NAD/08
Try it again.	M/SOL/DOT/-/ACP/PRF/03

(3.) Operational Knowledge (OPK). References to knowledge that is constructed internally by the individual through processes of reasoning. This type of knowledge depends on conceptualizing relationships that are not inherent in objects or situations and generally involves operations that Piaget describes as part of "logico-mathematical knowledge".

(3.1) Causality (CAS). Reference to the causal relationship between the actions of objects or beings, and the events, object attributes, object states, or object relationships which are observed or experienced. Includes causal rationales about attributes of people, or relationships between, or with people. Often occurs in the context of observed changes in the state of objects or beings. There are four major types of causal explanations. They are:

(3.11) Efficacy (MAG). Reference to feelings as causal determinants of actions or events. The occurrance of actions or events are considered to be the result of wish fulfillment, omnipotence, magic, or to occur for no apparent reason.

(3.12) Phenomenalism (FEN). Reference to temporal and/or spatial contiguity as the determining causative factor for actions or events.

(3.13) Psychological (SYK). Reference to volitional aspects of actions by self or others; reference to the capacity to determine or control events or actions which result in specified effects.

Example from dyadic interaction	Coding
[referring to a checker game]	
F: Well what's gonna happen if you move there?	F/SOL/SYK/XPL/PRC/FAC/09
C: I'm gonna, you could move there and I could jump you.	C/RES/SYK/XPL/PRC/FAC/12

(3.14) Physical Causality (FIS). Reference to causation as the result of the action of one object or being physically contacting another; references to the use of tools, instruments, or inanimate forces as the cause of events or changes in objects or their states.

Examples from dyadic interactions.	Coding
Ex. 1	
F: Think you can get another one on top of it? [referring to a stack of blocks]	F/SOL/DOT/-/ACP/FAC/10
C: Nooo!	C/RES/DOT/-/ACP/FAC/01
F: No?	F/SOL/DOT/-/STA-R/PON/01
C: Then they'll fall down	C/RES/FIS/XPL/-/-/05
Ex. 2	
F: Oh you knocked--don't you lean on the table. You almost knocking it over by pushing the table.	F/REA-P/FIS/XPL/ACP/PRO/19

(3.2) Representation (REP). General discussion of the representational aspects of language behavior and/or specific means used to represent a particular object, event, or action. Includes general references to symbols or language signs. Also used if more than one form of representation is referred to.

(3.21) Indices (IND). Reference to part of an object or marks caused by objects as representing the total object.

(3.22) Symbols (SYM). Reference to a representation which has some resemblance to the actual object, action, or event, but is not a part of that object, action, or event. Kami (1971) identifies 4 types of symbols: (a) imitation, (b) make-believe, (c) onomatopeia, or sounds representing object, etc., (d) 3-dimensional models (e) 2-dimensional models (e.g., pictures, etc.).

Example from dyadic interaction	Coding
F: You know what I thought it looked like?	F/SOL/SYM/-/ACC/FAC/08
C: What?	C/SOL/SYM/DED/-/-/01
F: I thought it looked like Road Runner.	F/RES/SYM/OPN/-/-/06

(3.23) Language Signs (LSG). References to the meaning or nature of socially shared representations or codifications which do not resemble what is being signified. These include letters of the alphabet, written or spoken words, mathematical and scientific symbols, etc. Letter naming is coded LSG/DED.

Examples from dyadic interactions.	Coding
Ex. 1	
C: "O".	C/RES/LSG/DED/-/-/01
M: It's an "X".	M/REA/LSG/DED/STA/NAD/04
Ex. 2	
M: Do you know there are big "A"s and little "A"s, right?	M/SOL/LSG/-/ACC/FAC/11

(3.24) Semantic aspects (SEM): Reference to the meaning of a word, phrase or other sign. Includes the introduction of new vocabularly, and its meaning.

Examples from dyadic interactions. Coding

Ex. 1

C:	What's that knock mean?	C/SOL/SF . -/05
M:	That means she wants me to show you a different game.	M/RES/SEM/XPL/-/-/11

Ex. 2

F:	Do ya not-you know what I mean by height?	F/SOL/SEM/-/ACC/FAC/10

(Syntatic aspects are not coded as having substantive meaning since these references generally occur in reaction to incorrect usage. Such moves are considered to have instructional meaning and are coded as references to Language Mechanics (LAM).)

(3.3) Classification (CLS). General reference to the "ability to group objects together by coordinating their qualitative and quantitative aspects" (Kamii, 1971). Any discussion of a classification system or the criteria for including, and excluding, objects or beings from a particular class. References to hierarchical groupings and to subsets within specified groupings.

Ex. 1

M:	Now this is a, this is a sorting. We have to do a sorting job here. And we have to put them by size. See the little mark on them, by the mark, and by the size We got to put the tall ones together and the small ones together, and "X"s and the "O"s together. See some of them have "X"s and some of	M/STR/CLS/DEM/PRC/XPL/69

them have "O"s.

Ex. 2

C: Ya don't match the color — C/REA/CLS/FAC/-/-/06

Ex. 3

F: [Referring to a game] do you think this may be like 'Battleships'? — F/SOL/CLS/OPN/MAT/-/09

Ex. 4

F: And what we're interested in doing with putting these all together, is the same size. — F/STR/CLS/DEC/-/-/16

(3.31) Correspondence or Matching (COR). Reference to matching two or more objects or beings. (If main focus is on describing or defining the attribute or state-object relationship of the object, or being, code OAG or SOR.) Specific criteria for matching are not necessarily specified and matching may be referred to as finding the same or different object, picture, etc.

Examples from dyadic interactions.	Coding
Ex. 1	
F: Now find another block that's the same height and has the same letter on it.	F/SOL/COR/DNV/ACP/PRF/15
Ex. 2	
M: Which one with an "O" is a big?	M/SOL/COR/FAC/-/-/08
C: Coo.	C/RES/LSG/-/STA-H/RPT/01
M: This one?	M/SOL/COR/OPN/-/-/02
C: No.	C/RES/COR/OPN/-/-/02

Ex. 3

M: How about these? Do these match?	M/SOL/COR/FAC/-/-/06
C: No, because they're not the same, both "O"s.	C/RES/COR/XPL/-/-/09

(3.32) Seriation (SER): References to "... the comparing and arranging of things according to a given dimension by coordinating transtive relationships." (Kamii, 1971, p. 390). Ordering a series of three or more objects (e.g., by size, color shades, weight, height, volume, pitch, etc.).

(3.4) Numerical Relationships (NOS). General references to numbers, and/or to numerical relationships which cannot be specifically categorized as counting, sequencing, or quantifying. Also references to more than one of the specific categories of numerical relationships.

Example from dyadic interaction	Coding
F: Yeah, and six is more than five, right?	F/REA/NOS/FAC/STA/POS/07 F/SOL-T/NOS/-/STA/PON/01

(3.41) Quantifying (QNT). Reference to the amount of objects or people without specific use of number names. Coded only when the main focus of the move is on the quantity of objects or things or on their relative quantity.

Example from dyadic interaction	Coding
C: I got more blocks than you.	C/REA/QNT/FAC/MAT/-/06

(3.42) Counting (NUM). Reference to cardinal numbers or to enumerating objects or beings.

Example from dyadic interaction	Coding
F: How many are there?	F/SOL/NUM/FAC/-/-/04
C: Uhn. One, two, three, four five, six.	C/RES/NUM/DED/-/-/06

(3.43) Sequencing (SEQ). References to the arbitrary ordering of objects, beings, or events in terms of numerical order or positional order. Sequencing differs from Counting because ordinal numbers, rather than cardinal numbers, are used. Sequencing differs from Seriation because it is not limited to a given dimension(s) nor is it dependent upon transitive relationships.

Example from dyadic interaction	Coding
Ex. 1	
C: First you then me.	C/SOL/SEQ/-/PRC/PRF/04
M: O.K, first me.	M/RES/SEQ/-/PRC/CPL/03
Ex. 2	
F: [referring to a patterned sequence of beads] The blue one goes on next.	F/REA/SEQ/FAC/-/-/06

Substantive-logical meaning categories.

"Substantive-logical meanings refer to the cognitive processes involved in dealing with the subject matter under study. Substantive-logical meanings are classified under three major process categories: (a) analytic process; (b) empirical process; and (c) evaluative process."[1]

For purposes of *this* study these subcategories are regarded as operationally defined behaviors which indicate communicative functions (i.e., they indicate how the substantive content is presented).

(1.) "*Analytic process*. Analytic statements are statements about the proposed use of language. Analytic statements are true by virtue of the meaning of the words of which they are composed. They depend for their truth on an agreed-upon set of rules and follow logically from accepted definitions. The statement 'Mother is a female parent,' for example is necessarily true because 'mother' means the same as 'female parent'. To define a term is to indicate what the term means, to state how it is used, or to give a verbal equivalent. A definition can be expressed in two ways: (1) by talking about the characteristics designated by a term; or (2) by talking about specific instances of the class designated by a term. Interpreting bears the same relationship to *statements* that defining does to *terms*.

(1.1) "*Defining--General* (DEF). To define in a

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[1] Bellack et al., *The Language of the Classroom*, p.22.

general manner is to give the defining characteristics of a class and to give a specific example of an item within the class. DEF is also coded when the type of definition asked for or given is not clear."[1]

Example from dyadic interaction	Coding
M. Yeah gums. That's what holds the teeth in.	M/REA/OAF/DEF/-/-/09

(1.11) "Defining--Denotative (DED). To define denotatively is to refer to the objects (abstract or concrete) to which the term is applicable. A denotative definition cites the objects to which the term may correctly be applied, and these objects constitute the denotation of the term."[1]

Examples from dyadic interactions.	Coding
Ex. 1	
M: [referring to a picture] Who's that?	M/SOL/SYM/DED/-/-/03
Ex. 2	
F: What's the letter on top of it?	F/SOL/LSG/DED/-/-/08
C: "N".	C/RES/LSG/DED/-/-/01
Ex. 3	
C: What is this?	C/SOL/OAN/-/MAT/DED/03

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[1] Ibid.

[1] Ibid., p.23.

F: I don't know, I think that's something you can make pictures out of. F/RES/OAF/-/MAT/DED/

(1.12) "Defining--Connotative (DEC). To define connotatively is to give the set of properties or characteristics that an object (abstract or concrete) must have for the term to be applicable. DEC thus refers to the defining characteristics of a given term."[1]

Example from dyadic interaction	Coding
M: And we're also gonna match by how big they are, how tall they are.	M/STR/COR/DEC/-/-/15

(1.2) "Interpreting (INT). To interpret a statement is to give its verbal equivalent, usually for the purpose of rendering its meaning clear."[2]

Example from dyadic interaction	Coding
M: That's a short one. The little one.	M/REA/OAH/INT/-/-/08

(2) "Empirical process. Empirical statements give information about the world, based on one's experience of it. The distinguishing mark of empirical statements is that they are verified by tests conducted in terms of one's own experience. In other words, one makes observations and

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[1] Ibid., p. 23.

[2] Ibid.

decides whether the statement is true or false.

(2.1) "Fact-stating (FAC). Fact-stating is giving an account, description, or report of an event or state of affairs. To state a fact is to state what is, what was in the past, or what will be in the future...

"The facts stated or reported need not be singular to be coded as FAC. Generalizations or universal statements are also coded FAC...."[1]

Examples from dyadic interactions		Coding
Ex. 1		
C:	You got money	C/REA/QNT/FAC/-/-/05
Ex. 2		
C:	The table's a little tipsy, isn't it?	C/REA/OAG/FAC/-/-/06 C/SOL-T/OAG/-/STA/PON/03
F:	Yeah. The table's a little tipsy, you're right.	F/RES/OAG/-/STA-R/POS/10

(2.2) Nonverbally Demonstrating (DNV). A nonverbal demonstration is the performance of an action or series of actions in order to demonstrate how that action is performed, or what the effect of that action is. Nonverbal demonstrations are not accompanied by relevant verbal explanations of the action(s) being performed; they may.

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[1] Ibid., p. 24.

however, be accompanied by verbalizations which, although not relevant to the demonstration per se, do have an instructional function (e.g., "Now watch this.", "See?." After I'm done you can do it.", etc.).

Examples from dyadic interactions.	Coding
Ex. 1	
M: Find an X. Where is the 'X'?	M/SOL/LSG/DNV/ACP/PRF/07
C:	C/RES-NV/LSG/DNV/ACP/CPL/0
M: That's right!	M/REA/LSG/-/ACP/POS/03
Ex. 2	
F: Let me show ya two more and then you can see how easy the fish is gonna be.	F/STR/SYM/-/ACP/DNV/18

(2.3) Verbally Demonstrating (DEM). A verbal demonstration involves the performance of an action, or series of actions, in order to demonstrate how that action is performed, or what the effect of that action is. Verbal demonstrations are accompanied by verbal explanations that describe the action being performed, or describe its effects. These verbalizations provide specific relevant terms and help to clarify the action(s) being demonstrated.

Examples from dyadic interactions	Coding
Ex. 1	
F: So you got to roll it, like this. See?	F/STR/DOT/DEM/-/-/09
Ex. 2	

M: And I'm gonna put the big tall cylinders together. And now I'm gonna take the little, tiny cylinders and I'm gonna put them together. M/STR/COR/DEM/ACP/FAC/27

(2.4) "*Explaining* (XPL). To explain is to relate an object, event, action, or state of affairs to some other object, event, action, or state of affairs; or to show the relation between an event or state of affairs and a principle or generalization; or to state the relationships between principles or generalizations... explaining and inferring are regarded as the same process.

"A statement is coded XPL when it concerns the *effect* of some event or state of affairs on some other event or state of affairs; or when the statement gives the *reasons* for an event or state of affairs (i.e.,relates an event to some general principle). The relationship between two events, facts or states of affairs is often expressed in terms of 'If...,then....' One way of showing relationships is by comparing and contrasting. Therefore, all *explicit* instances of comparing and contrasting are coded XPL.

"Explanations frequently are given in response to questions asking why or how some events occur. The 'why' or 'how' may be explicit (i.e., in a preceding question) or implicit in the context of the statement. Also, the word 'because' is frequently a verbal cue indicating the explanatory nature of the statement."[1]

Examples from dyadic interactions | Coding

Ex. 1

F: No, that can't go together because they're different shapes. F/REA/COR/XPL/ACP/NEG/11

Ex. 2

M: Show me again and that worked so well. But don't bang it though or you're gonna hurt your hand. M/STR/DOT/XPL/ACP/PRF/21

(3.) "*Evaluative process*. Evaluative statements are statements that grade, praise, blame, commend, or criticize something. Evaluative statements are verified by reference to a set of criteria or principles of judgement. A common set of criteria is essential if individuals are to reach agreement regarding the value of a given act, object, or state of affairs.

(3.1) "*Opining* (OPN). To opine is to make statements in which the speaker gives his [or her] own valuation regarding (a) what should or ought to be done, or (b) fairness, worth, importance, or quality of an action, event, person, idea, plan, or policy."[1]

Examples from dyadic interactions | Coding

Ex. 1

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[1] Ibid., pp. 24, 25.

[1] Ibid., p. 25.

C: [referring to a picture] He's terrible. C/REA/SYM/OPN/-/-/03

Ex. 2

M: This is a kind of a ricketty table, isn't it? M/REA/OAG/OPN/-/-/08 M/SOL-T/OAG/-/STA/PON/01

(3.2) "Justifying (JUS). To justify is to give reasons for holding an opinion regarding (a) what should or ought to be done, or (b) fairness, worth, importance, or quality of an action, event, policy, idea, plan, or thing.

"Justifying statements are intended as support or criticism of opinions that either have been explicit in a previous statement or are implied within the context of the interaction. Justifying statements are frequently preceded by an opining statement, although this is not a necessary condition for coding JUS."[1]

(4.) Not Applicable (NA). When no substantive-logical meaning occurred the logical process is coded as NA. (NA is indicated in coding examples by the use of a dash).

(5.) "Not Clear (NCL). When the wording or sense of a statement is ambiguous and the substantive-logical meaning cannot be determined, the logical process is coded NCL.

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[1] Ibid., pp. 25, 26.

Instructional meaning categories.

"In addition to talking about a particular area of study....[parents and children] also discuss matters pertaining to... [management of the interaction that is occurring, to the materials being used], and procedures that are part of the instructional process."[1] The following categories are used to indicated the types of instructional content that are referred to.

(1.) Materials (MAT). Reference is made to the materials that were provided for the session. If the main focus is on identifying materials by name or on describing their function(s), then the substantive meanings of OAN or OAF must also be coded.

Examples from dyadic interactions	Coding
Ex. 1	
C: Why do they have clay?	C/SOL/-/-/MAT/XPL/05
M: Cause some kids might like to play with it.	M/RES/-/-/MAT/XPL/09
Ex. 2	
M: Oh look, here's a puzzle.	M/STR/OAN/-/MAT/DED/06
Ex. 3	
C: Daddy, this looks hard for me to do.	C/REA/ACH/-/MAT/OPN/08

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[1] Ibid., pp. 25, 27

F: I know it, well okay, you wanna do somethin' else?	F/REA/ACH/-/-/STA/POS/03 F/SOL/ACH/-/MAT/DIR/07

(2.) "Person (PER). Discussion of...[adults' or children's] person, physiognomy, dress, expression, [behavior,] or appearance. Used also when a personal experience is the topic under discussion."[1]

Examples from dyadic interactions	Coding
Ex. 1	
C: You're silly you.	C/REA/-/-/PER/NEG/04
Ex. 2	
F: ....you are impossible.	F/REA/-/-/PER/NEG/04
Ex. 3	
M: You're right. You do such a good job. I'm really proud of you.	M/REA/ACH/-/PER/POS/5
Ex. 4	
C: Does Ruth Kahn live here?	C/SOL/-/-/PER/FAC/05

(3.) "Procedure (PRC). Discussion of any course of action or set of activities, continuing activity, or future activity. Includes references to how...[situation] is to be conducted and what regulations are to be observed. Refers also to specific instances of ... regulations or practice [for interacting]"[2]. All references to the rules of a game or interaction are also coded PRC.

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[1] Ibid.

Examples from dyadic interactions	Coding
Ex. 1	
F: Who goes first?	F/SOL/SEQ/-/PRC/FAC/03
Ex. 2	
C: See, the, not only the kings can backwards, but the, these players can go backwards	C/STR/WAY/FAC/PRC/XPL/16
Ex. 3	
M: Did you play with these toys last time, with Daddy? Did ya?	M/SOL/SEQ/-/PRC/FAC/12

(4.) "*Statement* (STA). Reference to any verbal utterance [or gesture in place of an utterance], particularly the meaning, validity, truth, or propriety of that utterance. May refer to a single word, sentence, paragraph or longer statement."[1]

Examples from dyadic interactions	Coding
Ex. 1	
M: These are both the same then, aren't they?	M/REA/COR/FAC/-/-/06 M/SOL-T/COR/-/STA/PON/03
Ex. 2	
C: I know, but Daddy you'll jump me.	C/REA/DOT/-/PRC/FAC/08
F: That's right, okay.	F/REA/DOT/-STA/POS/04

(4.1) *Repeated statement* (STA-R). Repetition of the

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[2] Ibid., p. 27.

[1] Ibid.

previous speaker's statement or a portion of that statement. Repeated statements may acknowledge the previous statement and represent an implicit positive evaluation, they may be utilized in order to solicit a confirmation that one understood the previous statement accurately, they may provide opportunities for word play, for practising articulation, or they may be echolalic.

Examples from dyadic interactions		Coding
Ex. 1		
F:	I thought it looked like the 'Road Runner'.	F/RES/SYM/OPN/-/-/08
C:	You're right. It's the 'Road Runner'.	C/REA/SYM/DED/STA/POS/08
F:	No, it's not the 'Road Runner'.	F/REA/SYM/DED/STA/NAD/07
C:	Ro-ro-ro-ro-ro Prrunner.	C/REA/SYM/-/STA-R/WPL/01
Ex. 2		
C:	Diagonally.	C/RES/WAY/DED/-/-/01
F:	Diagonally, that's right.	F/REA/WAY/-/STA-R/POS/04
Ex. 3		
C:	[referring to which face to match next in a game] Now the frowning face.	C/REA/OAN/-/PRC/FAC/04
M:	Now the frowning faces?	M/SOL/OAN/-/STA-R/PON/04
C:	Yeah.	C/RES/OAN/-/STA/POS/01
Ex. 4		
M:	Here's blocks.	M/REA/OAN/-/MAT/DED/03
C:	Blocks.	C/REA/OAN/-/STA-R/NCL/01

(4.2) Expanded statements (STA-E). Expanded statements are statements which go beyond simple imitations or repetitions. The word order and contentives provided by the first speaker are retained, but a well-formed sentence is created by adding words to the original statement. While the additional words do indicate that the speaker engaging in the expansion is interpreting the previous speaker's statement, contextual clues are utilized and the expanded statement does not violate the apparent meaning of the original statement (Brown, 1973; Brown and Bellugi, 1964; Cazden, 1972).

Examples from dyadic interactions	Coding
Ex. 1	
M: Alright, do you want to do the rest of that body, or do you want to try a different one now?	M/SOL/-/-/PRC/DIR/21
C: Different one.	C/RES/-/-/PRC/FAC/02
M: Want to make a different one, this time?	M/SOL/-/-/STA-E/PON/08
Ex. 2	
C: Here it is. A puzzle!	C/RES/OAG/-/MAT/FAC/05
F: A jigsaw puzzle.	F/REA/OAN/-/STA-E/POS/03
C: A jigsaw puzzle.	C/REA/OAN/-/STA-R/POS/03
Ex. 3	
C: A, B, Deee.	C/RES/LSG/DED/-/-/03
M: That's right. They're the A,B,C's.	M/REA/LSG/-/STA-E/POS/09

(4.3) Altered statements (STA-A). Altered statements, or references to altered statements, are contingent on the previous speaker's statement. However, the manner of presentation or the meaning of the original statement has been changed to some degree. The nonverbal or poorly articulated response of one speaker may be verbalized by the other speaker, an original statement may be repeated and embellished, or recast in such a way that the apparent meaning of the original statement has been altered. Although in altering the statement contextual clues are relied upon, a higher degree of inference is involved in altered statements than in expanded statements. Verbal interpretations of gestures are coded STA-A (see example 6 below).

Examples from dyadic interactions	Coding
Ex. 1	
C: Not a little house.	C/RES/OAZ/FAC/-/-/04
F: It's a big house?	F/SOL/OAZ/FAC/STA-A/INT/05
Ex. 2	
C: He's looking right here.	C/REA/WAY/FAC/-/-/05
M: Yeah, he's lookin right at cha.	M/REA/WAY/FAC/STA-A/POS/07
Ex. 3	
C: House.	C/RES/SYM/DED/-/-/01
M: You're gonna make a house?	M/SOL/DOT/FAC/STA-A/PON/06
Ex. 4	
C: That water's down the hole.	C/REA/LOC/FAC/-/-/06

F:	The water goes down the hole?	F/SOL/SPS/-/STA-A/PON/06
C:	Yeah.	C/RES/SPS/-/STA-A/POS/01

Ex. 5

C:	Ah lah ahah.	C/RES-NCP/-/-/-/NCL/00
F:	What? Put'em back?	F/SOL/-/-/STA-A/PON/04

Ex. 6

M:	Is that the same shovel?	M/SOL/COR/FAC/STA/PON/05
C:	[Child shakes head]	C/RES-NV/COR/-/STA/NEG/00
M:	No?	M/SOL/COR/-/STA-A/PON/01

(5.) "Action--General (ACT). Reference to performance, action, or event where the nature of the performance (whether vocal, nonvocal, cognitive, or emotional) cannot be determined or when more than one of the subcategories...[5.1 through 5.4] are involved."[1]

Examples from dyadic interactions   Coding

Ex. 1

M:	You listen, you listen and you do.	M/SOL/-/-/ACT/PRF/05

Ex. 2

F:	Well, do you think you did a good job?	F/SOL/ACH/-/ACT/PON/09

Ex. 3

M:	Don't be silly.	M/SOL/-/-/ACT/PRO/04

(5.1) "Action--Vocal (AVC). Reference to action

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[1] Ibid., p.28.

involving the emission of speech or sound. Used for the physical qualities of the action or the act of saying something. This includes references to the...pace, volume, pitch, and diction of vocal action."[1]

<u>Examples from dyadic interactions</u>	<u>Coding</u>
Ex. 1	
F: You know there's a faster way of doing this.	F/STR/DOG/-/ACP/FAC/10
C: Tell me.	C/SOL/DOG/-/ACV/PRF/02
Ex. 2	
M: This is a circle right here. But this whole shape is called a cylinder. Can you say that?	M/REA/OAP/DED/-/-/14 M/SOL/OAP/-/ACV/PRF/04
C: Cylinder.	C/RES/OAP/-/STA-R/CPL/01
Ex. 3	
C: Why are they laughing there?	C/SOL/-/-/ACV/XPL/05

(5.2, "<u>Action--Physical</u> (ACP). Reference to action where physical movements are primary. Includes writing, passing papers, walking, hearing, and seeing"[2] (If attention is being solicited then code ACC)

<u>Examples from dyadic interactions</u>	<u>Coding</u>
Ex. 1	

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[1] Ibid.

[2] Ibid.

M:	Well, first jump over my man, because there's an empty space and you're next to him.	M/RES/SPS/FAC/ACP/XPL/18

Ex. 2

C:	I don't watch the camera.	C/REA/-/-/ACP/FAC/06

Ex. 3

C:	Oh, can she hear us?	C/SOL/SOR/-/ACP/FAC/05

Ex. 4

M:	Come over here.	M/SOL/-/-/ACP/PRF/03
C:	Nooo!	C/RES/-/-/ACP/NCM/01

(5.3) "Action--Cognitive (ACC). Reference to action where a cognitive process is principally involved. This includes thinking, imagining, knowing, supposing, understanding, or not understanding, listening, believing, remembering, and reading (silently)."[1] Solicitations for attention are coded ACC/PRF.

Examples from dyadic interactions | **Coding**

Ex. 1

C:	I'm a good thinker, aren't I.	C/REA/ACH/-/ACC/POS/05 C/SOL-T/ACH/-/STA/PON/03

Ex. 2

M:	You're not paying attention	M/REA/-/-/ACC/FAC/06

Ex. 3

F:	You understand?	F/SOL/LSG/-/ACC/FAC/02

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[1] Ibid., p. 28.

Ex. 4

C:	Dad?	C/SOL/-/-/ACC/PRF/01
F:	What?[1]	F/RES/-/-/ACC/CPL/01

Ex. 5

M:	Do you remember that?	M/SOL/-/-/ACC/FAC/04

(5.4) "Action--Emotional (ACE). Reference to action where feelings. or emotions are principally involved. Includes feeling bad. good. sorry. thankful, grateful, relieved. or upset."[2]

Examples from dyadic interactions		Coding
Ex. 1		
F:	Daddy wants to do the blocks.	F/STR/-/-/ACE/FAC/06
Ex. 2		
F:	You want to look at this? You can try to make one of these if you want.	F/STR/-/-/PRC/ALW/17
C:	Oh Daddy I found I always thank you.	C/REA/SED/-/ACE/FAC/08
Ex. 3		
C:	I'm making something different on the other side.	CC/REA/-/-/ACP/ALT/09
M:	Alright that's fine.	M/REA/-/-/ACP/ALW/04
C:	You don't care?	C/SOL/-/-/ACE/FAC/04

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[1] Although the voice inflection for this move is questioning. the function of this move is to signal that the speaker's attention has been captured: and therefore, it is coded as a response to the solicitation for attention.
[2] Ibid., p. 29.

Instructional-logical meaning categories.

"While instructional-logical meanings include those processes listed under substantive-logical meanings, they also refer to distinctly didactic verbal moves such as those involved in positive and negative rating and giving instructions. For this reason, additional subcategories under the logical processes are necessary.[1]

For purposes of this study these subcategories are regarded as operationally defined behaviors which indicate communicative functions (i.e., they indicate how the instructional content is presented).

(1.) "Analytic process. (Same as substantive-logical meanings).

(1.1) "Defining--General (DEF)". (same as substantive-logical meaning)

Example from dyadic interaction	Coding
F: What's all this stuff in here?	F/SOL/-/-/MAT/DEF/07

(1.11) "Defining--Denotative (DED)"[1]. (same as substantive-logical meaning)

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[1] Ibid.

Example from dyadic interaction	Coding
F: Those are instructions.	F/REA/-/-/MAT/DED/03

(1.12) "Defining--Connotative (DED)". (same as substantive-logical meaning)

Example from dyadic interaction	Coding
M: I see two pieces with blue sky that also have part of the yellow sun.	M/REA/OAC/-/MAT/DEC/15
M: [referring to blocks] Some of them have 'X's and some of them have 'O's	M/REA/LSG/-/MAT/DEC/11

(1.2) "Interpreting (INT)". (same as substantive-logical meaning)

Example from dyadic interaction	Coding
M: Can we, could you stand these up on the end? Stand'em up like you and I stand up?	M/SOL/SPS/-/ACP/PRF/10 M/REA/SPS/-/STA/INT/09

(2.) "Empirical process. (same as substantive-logical meanings)"

(2.1) "Fact-Stating (FAC)"[1]. (same as substantive-logical meaning)

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[1] Ibid.
[1] Ibid.

Examples from dyadic interactions   Coding

Ex. 1

F: Here we go.   F/STR/-/-/PRC/FAC/03

Ex. 2

M: You see something in there that you want?   M/SOL/-/-/ACP/FAC/06

C: I find it.   C/RES/-/-/ACP/FAC/03

Ex. 3

C: That's what they had a school.   C/REA/-/-/MAT/FAC/07

(2.2) Nonverbally Demonstrating (DNV). (same as substantive-logical meaning)

Examples from dyadic interactions   Coding

Ex. 1

C: [Child is stacking blocks] Go like that.   C/REA/DOT/-/ACP/DNV/03

Ex. 2

F: Go ahead, show me.   F/SOL/DOT/-/ACI/DNV/04

(2.3) Verbally Demonstrating (DEM). (same as substantive-logical meaning)

Example from dyadic interaction   Coding

M: You take the big one and then you take another big one and put it right there.   M/STR/OAZ/DEC/ACP/DEM/17

(2.4) "Explaining (XPL)"'. (same as substantive-logicl meaning)

Example from dyadic interaction	Coding
F: You can't do those until we get it all right again.	F/STR/-/-/PRC/XPL/12

(3.) "Evaluative process". (same as substantive-logical meaning)

(3.1) "Opining (OPN)". (same as substantive-logical meaning)[1]

Examples from dyadic interaction	Coding
Ex. 1	
M: Those are nice, huh?	M/REA/-/-/MAT/OPN/03 M/SOL-T/-/-/STA/PON/01
Ex. 2	
C: Here's a...	C/REA/-/-/MAT/NCL/03
M: Very complicated game.	M/REA/-/-/MAT/OPN/03

(3.2) "Justifying (JUS)"[2]. (same as substantive-logical meaning)

Example from dyadic interaction	Coding
C: No, but I want to play a different game	C/REA/-/-/PRC/ALT/09
M: Okay, but let's do this. I want, I want this to be finished first, honey. This is important for Mrs. Kahn's paper she's writing.	M/REA/SEQ/-/PRC/FAC/14 M/REA/-/-/PRC/JUS/10

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[1] Ibid.
[2] Ibid.

(3.4) Rating (RATE). "Ratings can convey critical and/or evaluative meanings. A critical rating is a judgement of truth or falsity based on rational criteria. An evaluative rating gives the rater's partiality, thus it is a more subjective response. Ratings range from positive to negative. They often occur in reaction to statements."[1]

In a younger population, or in the context of performing a task, actions are frequently rated; persons may also be rated.

(3.41) Positive Ratings (POS). "Positive ratings range from distinctly affirmative to those that implicitly affirm by repeating what is rated."[2]

Examples from dyadic interactions		Coding
Ex. 1		
M:	What colors do you have there?	M/SOL/OAC/DED/-/-/06
C:	Red.	C/RES/OAC/DED/-/-/01
M:	Yeah.	M/REA/OAC/-/STA/POS/01
Ex. 2		
C:	Look. [shows M. a picture she colored]	C/SOL/-/-/ACP/PRF/01

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[1] James L. Neujahr. The Individualized Instruction Game. (New York: Teachers College Press, 1975), p.20.

[2] Ibid.

M: Oh, That's beautiful! M/RES/-/-/ACP/POS/04

Ex. 3

M: And if you get all my men, you are the winner. M/REA/QNT/-/PRC/XPL/11

C: Wow! C/REA/-/-/PRC/POS/01

(3.42) Negative Ratings (NEG). "Negative ratings include those which reject by stating the contrary and those which reject by a distinctly negative rating."[1] Ratings which indicate some reservation, that is ratings that are qualifying, are also coded NEG.

Examples from dyadic interactions	Coding
Ex. 1	
F: Somethin's wrong.	F/REA/COR/-/ACP/NEG/03
Ex. 2	
M: Find the 'S' for me. Where's the 'S'?	M/SOL/LSG/DNV/ACT/PRF/09
C: (picks a lettered block)	C/RES-NV/LSG/DNV/ACT/CPL/00
M: No.	M/REA/LSG/-/ACT/NEG/01
Ex. 3	
F: You're a brat.	F/REA/-/-/PER/NEG/04
C: Yeah.	C/REA/-/-/STA/POS/01

(3.43) Neutral Ratings (NEU). Neutral ratings do not indicate whether a positive or negative evaluations is intended. They serve to acknowledge or confirm an action, a

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[1] Ibid.

statement, or an event.

Examples from dyadic interactions	Coding
Ex. 1	
F: Did you do this before?	F/SOL/-/-/PRC/FAC/05
C: Yes.	C/RES/-/-/PRC/FAC/01
F: Oh.	F/REA/-/-/PRC/NEU/01
Ex. 2	
M: You can't go backwards.	M/RES/WAY/-/PRC/FAC/05
C: Oh.	C/REA/WAY/-/STA/NEU/01

(3.44) Positive or Negative Rating (PON). "Solicitations in which a request is made for either a positive or a negative rating."[1] (For analysis these types of moves are included as part of the subcategory of opining.)

Examples from dyadic interactions	Coding
Ex. 1	
M: That matches that one?	M/SOL/COR/-/STA/PON/04
C: Yeah.	C/RES/COR/-/STA/POS/01
Ex. 2	
C: Like this?	C/SOL/-/-/ACP/PON/02
F: Yeah. okay.	F/RES/-/-/ACP/POS/02

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[1] Bellack, et al., The Language of the Classroom, p. 31.

(4.) Extra-logical Meaning Categories. "Instructional moves with extra-logical meanings are those that cannot be verified by analytic, empirical, or evaluative criteria. Rather than making assertions or denials, these moves make prescription or prohibitions, or request that prescriptions or prohibitions be made..."[1]

(4.1) Soliciting a Performance (PRF). "Solicitations that ask or demand ...that someone do something. These include directives and imperatives."[2]

Examples from dyadic interactions	Coding
Ex. 1	
M: Count one line, then count the next line.	M/SOL/NUM/DED/ACV/PRF/08
Ex. 2	
F: Come on up here.	F/SOL/-/-/ACP/PRF/04
Ex. 3	
C: You help.	C/SOL/SED/-/ACT/PRF/02

(4.2) "Prohibiting a Performance (PRO). The agent is directed to cease, or not to embark upon, a particular activity."[3]

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[1] Neujahr, The Individualized Instruction Game, p. 19.

[2] Bellack, et al., The Language of the Classroom, p. 31.

[3] Neujahr, The Individualized Instruction Game, p. 21.

Example from dyadic interaction	Coding
F: Wait a minute.	F/SOL/-/-/ACP/PRO/03

(4.3) Soliciting a Repetition (AGN). "The agent is directed to repeat the communication."[2]

Examples from dyadic interactions	Coding
Ex. 1	
C: What do you want to do?	C/SOL/-/-/PRC/DIR/06
F: Hm?	F/SOL/-/-/STA/AGN/01
C: What do you want to do?	C/SOL/-/-/PRC/DIR/06
Ex. 2	
C: Duah bey bey	C/RES-NCP/-/-/-/NCL/00
F: What?	F/SOL/-/-/STA/AGN/01
C: Wha da deby deba.	C/RES-NCP/-/-/STA/CPL/00

(4.4) "Asking To Be Directed (DIR). The emitter of this move is trying to find out what he (or she) is or is not to do. He (or she) expects to be given a directive. His (or her) solicitation may be general, involve several alternatives, or only one."[1]

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[2] Ibid.

[1] Ibid.

Examples from dyadic interactions | Coding

Ex. 1

F: What would you like to play with? F/SOL/-/-/MAT/DIR/07

Ex. 2

M: How do you want it? Do you want to make one bigger? Is that what you want to do? M/SOL/OAC/-/PRC/DIR/19

Ex. 3

M: What kind of a game should we play? M/SOL/-/-/PRC/DIR/08

(4.5) "Seeking Permission (RPR). The emitter of this move is requesting that he [or she] be permitted to perform a particular activity."[2]

Examples from dyadic interactions | Coding

Ex. 1

C: Let me get somethin' else. C/SOL/-/-/MAT/RPR/05

F: Alright. F/RES/-/-/MAT/ALW/01

Ex. 2

C: But Mom, can we play another game after? C/SOL/-/-/PRC/RPR/08

Ex. 3

M: But can I show ya how to build something special? M/SOL/-/-/PRC/RPR/10

(4.6) "Compliance". (CPL) The person to whom a directive is addressed either begins to carry out the

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[2] Ibid.

directive or indicates that he or she intends to carry it out."[1] If there is no verbal response by the person, or the response is non-comprehensible, and a reaction follows which clearly indicates that the directive was carried out, then compliance is assumed.

Examples from dyadic interactions		Coding
Ex. 1		
M:	Now find a yellow square.	M/SOL/OAC/DNV/ACP/PRF/05
C:	(based on M.'s response it is assumed that the child complied)	C/RES-NV/OAC/DNV/ACP/CPL/00
M:	Very good, okay!	M/REA/OAC/-/ACP/POS/03
Ex. 2		
C:	Daddy help.	C/SOL/SED/-/ACP/PRF/02
F:	Okay.	F/RES/SED/-/ACP/CPL/01

(4.7) "Permitting a Performance (ALW). The agent is allowed to carry out the activity. The performance is optional. A move coded ... [ALW] often follows a move seeking permission."[2] Adults occasionally give permission even when it was not directly requested.

Examples from dyadic interactions		Coding
Ex. 1		
C:	'kay Dad can I stick 'em	C/SOL/DOT/-/ACP/HPR/09

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[1] Ibid., p. 22.

[2] Ibid., p. 21.

on the Pegboard?

F: Sure, that's what you're gonna do. — F/RES/DOT/-/ACP/ALW/09

Ex. 2

C: I want this. — C/STR/-/-/MAT/FAC/03

M: Okay, you want to see what that is? Alright, open it up. — M/REA/-/-/STA-A/PON/08 M/REA/-/-/ACP/ALW/08

(4.8) "Alternative (ALT). The person to whom a directive is addressed indicates that he will carry out some activity in place of the one prescribed, or that he will carry out the prescribed activity at other than the prescribed time."[2]

Examples from dyadic interactions	Coding
Ex. 1	
C: You can do it this way, can't ya too?	C/REA/DOT/-/PRC/ALT/06 C/SOL-I/DOT/-/PRC/PON/04
F: Nope, it just goes one way.	F/RES/DOT/-/PRC/NEG/06
C: Daddy, see, if you do it this way, is kinda better to me.	C/STR/DOT/DNV/PRC/ALT/13
Ex. 2	
M: Would you like to read me a story?	M/SOL/-/-/ACT/PON/08
C: You read it.	C/RES/-/-/ACT/ALT/03
M: Why don't you read it to me.	M/SOL/-/-/ACT/ALT/06

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[2] Ibid., p. 23.

C: No, I wanted to do the chackers. — C/RES/-/-/ACT/NCM/01

Ex. 3

F: Let's see how smart you are. Take... — F/SOL/ACH/-/ACT/DNV/08

C: Daddy, you do, you build the ca..., you do that a, I'll do the clay. — C/STR/-/-/PRC/ALT/16

(4.9) "Non-compliance (NCM). The person to whom a directive is addressed indicates that he [or she] will not perform a prescribed activity and he [or she] gives no alternative."[1] When a request is repeated after no apparent response, after a noncomprehensible response, or after a vocalization which indicated a negative response (e.g., whining, crying, angry shouting), it is assumed that the recipient of the directive did not comply with the directive.

Examples from dyadic interactins		Coding
Ex. 1		
F:	Put it over there.	F/SOL/LOC/-/ACP/PRF/04
C:	No.	C/RES/LOC/-/ACP/NCM/01
Ex. 2		
M:	Well, come over here.	M/SOL/-/-/ACP/PRF/04
C:	(crying) Noo!	C/RES/-/-/ACP/NCM/01
M:	Come over here.	M/SOL/-/-/ACP/PRF/03
C:	(continues to cry)	C/RES-NV/-/-/ACP/NCM/00

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[1] Ibid., p. 22.

M: Come over here.	M/SOL/-/-/ACP/PRF/03

(4.10) Joking (JOK). The person makes an overt effort to be amusing, or reacts to an amusing action or event. Humourous teasing which does not imply a negative evaluation is considered to be joking behavior. Laughter not accompanied by a verbalization with logical meaning is coded as nonverbal Joking.

Ex. 1

F: Hey ...., you're getting to be a pro.	F/REA/ACH/FAC/PER/POS/09
C: (laughs)	C/RES-NV/ACH/-/STA/JOK/00

Ex. 2

M: This takes a lot of thinking-power here. (laughs) I think more on my part than yours.	M/REA/-/-/ACC/FAC/07 M/REA/-/-/STA/JOK/08

(4.11) Word Play (WPL). The emitter of the move is playing with sounds or words and not trying to communicate a logical meaning. Word play occurs most often when children are engaged in performing an activity, or when they are pretending. Word play may be vocal, verbal, or lyrical.

Examples from dyadic interactions	Coding
Ex. 1	
M: Oh, the dragon's roaring.	M/REA/SYM/-/ACV/FAC/05
C: Rooaaar!	C/REA/SYM/-/STA-P/WPL/01
Ex. 2	
C: (taking materials out of box) Boom tick-a-boom	C/REA/-/-/ACV/WPL/00

tick.

Ex. 3

F:	Now, get those.	F/SOL/COR/-/ACP/PRF/03
C:	(placing blocks in groups) Shape. Same shape. An' same shape. An' sssssssssame shape.	C/RES/COR/DEC/ACP/WPL/09

APPENDIX C

Coding Instructions[1]

1."General Coding Instructions

1.1 "Coding is from the viewpoint of the observer, with pedagogical meaning inferred from the [emitter's]...behavior.

1.2 "Grammatical form may give a clue, but is not decisive in coding. For example, SOL may be found in declarative, interrogative, or imperative form. Likewise, RES may be in the form of a question--frequently indicating tentativeness on the part of the speaker."[2]

1.3 All inaudible statements and statements which cannot be coded in one of the pedagogical move type categories are coded for the emitter (if that is discernable) and as Not Codable (NOC). Statements which are partially audible or ellipses are coded for pedagogical move type, if it is

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[1] Coding instructions not directly quoted differ from those provided by Bellack et al., and Neujahr.

[2] Bellack et al., *The Language of the Classroom*, p. 255.

clear, and for any of the other categories, if they are clear within the context in which they occurred. If partially audible statements, or ellipses. are not clear. they are coded as NOC. Moves that follow Not Codable moves are coded as usual.

2. Pedagogical Moves

2.1 If one member of the dyad reacts to the nonverbal behavior (NV) of the other member of the dyad by rating that behavior or specifically commenting on it then the nonverbal behavior is coded as having occurred and is subscripted to indicate it was nonverbal. Laughing without verbal commenting is coded as a nonverbal reaction to an amusing behavior or statement. When laughing is directly followed by a comment it is not coded as a separate nonverbal move, but rather as a verbal reaction to a joke. Crying, whining, shouting, etc. are also considered nonverbal moves if no verbal comments accompany the behavior.

Ex.1

F:	Can you put those in the box now?	F/SOL/ACH/-/ACP/FAC/08
C:		C/RES-NV/ACH/-/ACP/DNV/00
F:	No. now that doesn't go with that.	F/REA/COR/FAC/ACP/NEG/08

Ex. 2

F:	That's right....	F/REA/COR/-/STA/POS/04
C:	(laughs)	C/REA-NV/COR/-/STA/JOK/00

2.2 When a verbalization is so poorly articulated that it cannot be understood by the coder and transcriber, and when the other member of the dyad does not indicate that they understood the verbalization, then it is coded as non-comprehensible. If the substantive content or the instructional content continues to be the topic of the dialogue, the noncomprehensible move is coded for its content (substantive or instructional meaning). Only those words that are clearly articulated are counted as words for that move. Occasionally syntactical errors are serious enough to make a move noncomprehensible. In such cases the move is coded as non-comprehensible and only the clearly articulated words are counted and credited to the move.

2.3 Structuring (STR) moves are clearly initiative moves. They begin with some form of introductory remarks intended to start off a new activity, new topic of conversation, or introduce new materials. Structuring moves continue until a clear solicitation (SOL), or reaction (REA) occurs. Often the same speaker will first provide a structuring move followed by a solicitation. Structuring moves cannot be directly succeeded by responses (RES). If an intervening move occurs, a structuring move may be continued and is coded as a second instance of structuring.

2.4 Structuring moves are sometimes phrased obliquely, and determining the intent of the speaker may be confusing. Phrases such as "Now why don't we...", "Let me show you...", "Let's...", "How about if we...", are considered initiating efforts by a speaker who intends to launch an activity and are therefore coded as structuring moves whenever they are not responses to a previous solicitation or are not reactions to a previous response.

2.5 A soliciting (SOL) move begins whenever a request is initiated. A solicitation ends when a distinctly different solicitation is made or when a response, a reaction, or a structuring move is begun by either speaker.

2.6 Solicitations that request permission to speak have instructional and extra-logical meaning. They are coded as SOL/.../RPR. The move which follows and acknowledges the request for permission is considered a response even if a questioning tone of voice is used. Such a response usually grants permission (ALW) or prohibites (PRO) the activity. Requesting permission to speak rarely occurs during dyadic interactions, although speaking about a specific topic may be requested.

Ex. 1

C:	Ahhhh, see, talk about that?	C/SOL/-/-/ACV/RPR/04
M:	Ah-oh (means no) we don't talk about that.	M/RES/-/-/ACV/PRO/07

2.7 Not infrequently during dyadic interactions one member of the dyad solicits the other member's attention. Such a move has instructional meaning in the action-cognitive category and is considerd a directive to attend. Therefore such a move is coded as SOL/.../ACC/PRF/... and the response to that move, even if uttered in a questioning tone, is considered to be a complying response.

Ex. 1

C:	Dad?	C/SOL/-/-/ACC/PRF/01
F:	What?	F/RES/-/-/ACC/CPL/01

2.8 Tag questions occurring within or at the end of a structuring or reacting move are coded as soliciting tags, even if there is no extended pause or verbal cue that clearly solicits a response. Tag questions that occur within a larger soliciting move are not coded separately since they are considered to be a part of the overall soliciting move.

Ex. 1

F: Just a little different, isn't it? F/REA/COR/FAC/-/-/04
F/SOL-T/COR/-/SIA/PON/03

Ex. 2

F: Okay, now put the airplane back in the board, okay? F/SOL/DOT/-/ACP/PRF/10

2.9 "Implicit in any solicitation are the concepts of knowing or not knowing, doing or not doing. Therefore code "responding" for any one of the range of possible responses (including invalid ones), and also for any reply referring to knowing or not knowing, agreeing to do or refusing to do. The physical response to a directive will be coded as a responding move. However, in the case of responding to the directive to speak, the meaning of the utterance will be coded,... in addition to the fact that the respondent is complying with the directive to speak."[1]

2.10 "Occasionally a...[parent or child] responds to a SOL with a question. Coding in these instances is in terms of context and intent. For example, students frequently respond with a question to indicate the tentativeness of their responses. These are coded RES. If, however, the 'responding' question is a genuine solicitation

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[1] Naujahr, *The Individualized Instruction Game*, p. 93.

(i.e., expects a RES), it is coded SOL.

2.11 "A SOL which calls for a fact is coded FAC, but if the RES gives both a fact <u>and</u> an explanation, the substantive-logical meaning of the RES is coded XPL.

2.12 "A SOL which calls for an opinion is coded OPN, but if the RES gives both an opinion and a justification, the substantive-logical meaning of the RES is coded JUS.

2.13 "A speaker cannot respond to his own solicitation. (1) If the speaker answers his [or her] own question immediately after asking it, the question is taken to be rhetorical and a stylistic device rather than a true SOL. (2) If a speaker answers his [or her] own question after an intervening incorrect answer, the correct answer to the solicitation is coded as a reaction to the incorrect answer, since the purpose of the question was not to elicit a response from the questioner. (3) If a speaker answers his [or her] own question after a <u>pause</u>, the answer is coded as a reaction, indicating that the speaker is primarily reacting to the <u>absence</u> of an expected response. An asterik is indicated as part of the coding of the REA (i.e., REA-*) when this occurs."[1]

2.14 Directives which include specific instructions, or requests, that cannot be complied with without substantive knowledge (e.g."Find me an 'R'.") are coded for their extra-logical meaning as directives (PRF, PRO, DIR, or ALW) but also as expecting or providing substantive-logical meaning. Responses to such directives are assumed to have provided substantive-logical meaning only if that meaning is referred to by either member of the dyad.

Ex. 1

F:	Here you take this one. You put it with the same height and the same letter.	F/SOL/COR/DNV/ACP/PRF/16
C:	Nope.	C/RES/COR/-/ACP/NOM/01

Ex. 2

F:	Does that fit?	F/SOL/COR/FAC/-/-/03
C:		C/RES-NV/COR/DNV/-/-/00
F:	Okay.	F/REA/COR/-/ACP/POS/01

Ex. 3

F:	Okay, put it with another group.	F/SOL/COR/-/ACP/PRF/06
C:		C/RES-NV/COR/-/ACP/CPL/00
F:	Okay	F/REA/COR/-/ACP/POS/01

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[1] Bellack et al., The Language of the Classroom, pp. 257, 258.

Ex. 4

M:	What color should we put on next?	M/SOL/OAC/DED/ACP/DIR/07
C:	Hmm, um, my favorite color.	C/RES/OAC/FAC/-/-/03

Ex. 5

M:	Okay, I want to put out some faces and you find some that look exactly alike and pile some on top.	M/STR/DOG/XPL/PRC/PRF/21

Ex. 6

M:	Can you get another pile of four for me?	M/SOL/NUM/DNV/ACP/PRF/09
C:	One, two, three.	C/RES/NUM/DED/ACP/CPL/03
M:	How many?	M/SOL/NUM/FAC/-/-/02
C:	Three.	C/RES/NUM/FAC/-/-/01
M:	Oh, I thought we wanted four. Why don't you take a look there, count'em again and see how many you got.	M/REA/NUM/FAC/-/-/06 M/SOL/NUM/DED/PRC/PRF/17

2.15 "A reaction begins at the beginning of an utterance or following a nonverbal response or the absence of an expected move.

"A [reaction (REA)] is still in progress when the speaker:

a. Evaluates or otherwise discusses a previous move

b. Rephrases a previous move or makes reference to it

c. Expands a previous move by stating its implictions, interpreting it, or drawing conclusions from the same point or sub-point.

"A REA ends when any of the following occurs:

a. The utterance ends

b. A SOL begins

c. The speaker indicates the end of the REA by some verbal convention, such as, 'All right, now let's turn to...'

d. A distinct (not parenthetic) shift occurs to another substantive area not heretofore mentioned or not under immediate discussion

e. A distinct (not parenthetic) shift occurs from any substantive category to an instructional category not heretofore mentioned or not under immediate discussion."[1]

2.16 "A reaction to a solicitation occurs only when the reaction is about the solicitation and not a response to the solicitation."[2] (e.g. "That's a good question.")

3. Substantive Meanings

3.1 "Coding of substantive meanings is in terms of the main context of the discussion."[3] For example, if a dyad is discussing the block matching task and the specific attributes of the blocks which are

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[1] Ibid., pp. 259, 260.

[2] Ibid.

important for the matching task are mentioned, the move is still considered to be about matching the blocks (COR). If however, the focus of the discussion shifts to defining or explaining the attritutes per se, then the discussion would be coded as having substantive meaning in the object attritute categories (OAG).

Ex. 1

M:	So how come you put this block here?	M/SOL/COR/XPL/-/-/08
C:	'cause they were shorts.	C/RES/COR/XPL/-/-/04

Ex. 2

F:	And, and why does this little block go in these and not over there?	F/SOL/COR/XPL/-/-/13
C:	Well, because those have 'X's'.	C/RES/COR/XPL/-/-/05
F:	Yes. And what does that one have?	F/REA/COR/-/STR/POS/01 F/SOL/LSG/DFD/-/-/06

Ex. 3

C:	Because these go there.	C/RES/COR/DNV/-/-/04
F:	Right. Okay keep going.	F/REA/COR/-/ACT/POS/01 F/SOL/COR/-/ACP/PRF/03

3.2 "In coding, indicate whenever possible the substantive content to which the move refers or the substantive context of the move. The speaker

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[3] Ibid., p. 261.

may or may not explicitly refer to the substantive material. The absence of substantive-logical coding in these instances indicates that no substantive meanings were actually expressed.

4. <u>Substantive-Logical Meanings</u>

4.1 "Only when defining is the main focus is a move coded as defining. When the definition is within the immediate context of other substantive-logical meanings, defining is not coded.

4.2 "Responses giving facts within the context of an explanatory move or in a sequence of explanatory moves are coded explaining...[1]

4.3 "'Reverse' definitions, which give the definition and call for the term, are coded as defining moves.

4.4 "When more than one substantive-logical process occurs within a single pedagogical move, code according to the following order of priority:"[2]

a.) XPL (explaining)

b.) OPN/JUS (opining or justifying)

c.) DEM (demonstrating)

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[1] Ibid., pp. 261, 262.

[2] Ibid., p. 262.

d.) FAC (fact-stating)

e.) DNV (nonverbally demonstrating)

f.) DEF (defining and/or interpreting)

4.5 "An incorrect statement intended as the description of a state of affairs, such as....["Blue and yellow makes purple,"] would be coded FAC even though it is empirically incorrect.

5. Instructional Meanings

5.1 "Occasionally, within longer moves (e.g., a STR or a REA), reference is made t more than one of the instructional categories. In coding, identify the primary instructional function of the move or its principal focus, and code appropriately.

5.2 "Use the following order of precedence when more than one of the instructional categories are involved and the main intent of the discourse cannot be readily determined:"[1]

a.) STA (statement)

b.) STA-R (repeated statement)

c.) STA-E (expanded statement)

d.) STA-A (altered statement)

e.) MAT (materials)

f.) PRC (procedure)

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[1] Ibid., P. 262.

g.) PER (person)

h.) ACT (action-general, vocal, or emotional)

i.) ACC (action-cognitive)

j.) ACP (action-physical)

5.3 "MAT is coded without an instructional-logical category only when..."[1] [substantive and substantive-logical meanings are the main focus of the dialogue and the reference to materials does not convey a specific instructional-logical meaning."

Ex. 1

F:	[referring to a game] Do you think this may be like 'Battleships'?	F/SOL/CLS/OPN/MAT/-/09

Ex. 2

C:	Broken.	C/REA/CHG/FAC/MAT/-/01

Ex. 3

M:	[referring to materials] These are nice, huh?	M/REA/-/-/MAT/OPN/03

5.4 "ACC/FAC is coded when the cognitive process is the main intent of the move."[2]

Ex. 1

F:	Ya understand?	F/SOL/COR/-/ACC/FAC/02

Ex. 2

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[1] Ibid., p. 263.

[2] Ibid.

C: Oh, I know how many. C/RES/NUM/-/ACC/FAC/05

F: How many? F/SOL/NUM/FAC/-/-/02

5.5 "ACC/FAC is <u>not</u> coded when the reference to a cognitive process is incidental."[1]

Ex. 1

F: I don't think people use dice when they play checkers. F/REA/-/-/MAT/FAC/11

5.6 "Both ACC/FAC and the substantive and substantive-logical meanings are coded when the statement gives them approximately equal prominence."[2]

Ex. 1

C: Who's this guy? C/SOL/SYM/DED/-/-/04

F: I don't know. He's just a little boy, I guess. F/RES/SYM/FAC/ACC/FAC/12

Instructional-Logical and Extra-Logical Meanings

Instructional-Logical Meanings

6.1 In evaluating an action or a statement corrections or additional substantive information may be provided. When substantive meaning and substantive-logical meaning accompanies a rating of actions or statements the move is coded for substantive, substantive-logical, instructional, and instructional-logical meanings.

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[1] Ibid.

[2] Ibid.

Ex.1

M:	[referring to checker game] Wow, you got my man. That's right, it goes right on top of them [referring to King].	M/REA/SPS/FAC/ACP/POS/15

Ex.2

C:	That one zero.	C/RES/NUM/DED/-/-/03
M:	No, that's an 'X'.	M/REA/LSG/DED/STA/NEG/05

6.2 Ratings are generally provided for actions that have been performed, statements made, or events that occurred; however, they may refer directly to the person rather than the actions or statements of that person. Personalized ratings are coded as references to the instructional category PER if the main focus of the rating is not on the action performed, the statement made, or on a procedure, and if the reference to the other person was explicit (e.g. "You're a bad boy.", "Good boy."). If an action or statement was followed by a rating and no personal reference was made, it is assumed that the action performed, or the statement is the focus of the rating.

Ex. 1

C:	That's not a 'X'.	C/REA/LSG/FAC/-/-/05
F:	No. (note father is agreeing with a negative statement and therefore is considered to be giving a positive rating)	F/REA/LSG/-/STA/POS/01

Ex. 2

M:	First of all, I would like you to go and sit in that chair, okay?	M/SOL/-/-/ACP/PRF/15
C:	Okay	C/RES/-/-/ACP/CPL/01
M:	Good boy. That's nice listening	M/REA/-/-/PER/POS/02 M/REA/-/-/ACP/POS/04

Extra-Logical Meanings

6.3 Categories for extra-logical meanings are generally associated with the instructional meaning categories of actions or procedures. They may, however, be associated with any of the other instructional meaning categories. When extra-logical meaning occurs in conjunction with non-action categories, it is "understood that an *action* is the referent and that this action is associated with the appropriate instructional category."[1] Therefore "Give me the puzzle." would be coded MAT/PRF but "put the piece in the puzzle" would be coded ACP/PRF. (See 5.2 for list of precedence for instructional meaning categories.)

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[1] Ibid., p. 266.

Rules For Counting Words

1. Contractions count as two words. (I'm, don't, what's, it's. here's, etc.)

2. Elided words count as one. (gonna, wanna, hafta, etc.)

3. Hyphenated words or reduplicated syllables count as one word. (bye-bye, peepee, etc.)

4. Whole proper names (Ruth Kahn) and title-plus-surname (Mrs. Kahn) are counted as separate words. (ex. Ruth Kahn = 02, Mrs. Kahn = 02)

5. When a phrase or word is repeated with alterations or interruptions, it is only counted once. (ex. Look at that. Look at that. See it = 05)

6. Repetitions resulting from disfluency are not counted. (ex. I'm, I'm, I'm going = 03; Can't, can't, can't we play with this = 06)

7. Ah, Uh, Um etc. and words coded as NCP (non-comprehensible) are not counted as words. (ex. ah-oh = 01; ah that's good = 03; Seese = 00)

8. Moves coded as NV (non-verbal) and inaudible words are not counted. (ex. C/RES-NV/.../.../.../.../ = 00)

9. Commonly recognized sounds that are equivelant to words are coded and counted. (ex. Uh-huh ('yes') = 01; Mmhmm ('yes') = 01; Uh-uh ('no') = 01; yah = 01; Huh = 01; Oops = 01)

10. OK is counted as one word. (ex. O.K. Okay, or OK = 01)

APPENDIX D

Letter Sent to Parents for Recruitment of Subjects

Dear parents,

For the past nineteen years I have been working as a special educator. I have taught and consulted in the public schools, I have worked as an educational therapist and as a psycho-educational diagnostician. Right now I am working towards a doctoral degree in Special Education at the University of Connecticut. In order to complete my thesis I need the help and cooperation of parents like you. Below is a summary of the study I am doing. It includes the age of the children I need to observe, and the time and type of participation that would be involved.

Purpose of the study.

The purpose of this study is to observe and describe teaching interactions between parents and their children. I am interested in how parents help their children to learn a variety of things, not at all of which are directly taught in schools. I hope to observe both similarities and differnces in the approaches used by mothers and fathers. I would also like to compare the approaches used by parents who are interacting with handicapped or developmentally delayed youngsters and parents who are interacting with normally developing youngsters.

Population needed.

I need to observe both mothers and fathers as they interact with their 3 to 5 year old children.

Time and type of participation involved.

Two parent-child sessions are required, with each parent attending one of these two sessions at the University of Hartford in West Hartford, Connecticut. Brief testing of the child and interviewing of the parent can be completed at the end of the session or can be postponed and completed during a home visit. All sessions will be arranged to suit your convenience and can be scheduled for any day of the week or for the week ends.

Teaching-play sessions will take about 40 minutes each. During one of these sessions the mother and child will be video taped as they play together with toys generally found in nursery schools. After a 15 minutes play period the mother will present a block sorting game to the child and try to get the child to understand and complete it. The game will have been explained to each parent before the session. The other play session will be identical to the one described above except that the father and child will be the participants. During a separately scheduled home visit session or at the end of the play session. the child will be given the _Peabody Picture Vocabulary Test_ and each parent will be briefly interviewed.

A copy of the dissertation proposal is available on request. On completion of this study a summary of the results will be provided to all participating parents.

I would greatly appreciate it if you could share some of your time with me in order to help me to complete my study. If you are willing to participate please return the enclosed postcard. If you would like more information feel free to call me at 233-0650. Thank you very much.

Sincerely,

Sample of Postcard Included With Letter to Parents

I am interested in participating in your study.

Yes_____ No_____

I would like more information so please call.

Yes_____ No_____

(Please print when filling out this form)

Name of parents________________________________

Name of child________________________________

Address________________________________

Phone______________Best time to call____________

Child's birth date________________________________

month day year

PARENTS AS TEACHERS PROJECT

Informed Consent Form

I understand that I am being asked to participate in a research study which examines the way mothers and fathers teach their preschool youngsters. I realize that while I am playing with my child and while I am helping my child to learn how to do a block sorting task, I will be recorded on audio and video tape. I am also aware that my child will be given the Peabody Picture Vocabulary Test which is a test of verbal intelligence, and that I will be interviewed. I have been informed that the results of the Peabody Picture Vocabulary Test and information about my child's developmental level will be shared with me.

I understand that the tapes that are made may be used for research purposes, that all efforts will be made to protect our identity, and that confidentiality will be respected. I therefore grant Ruth Kahn permission to video and audio tape my sessions with my child.

Yes----------- No-----------

In addition I also give Ruth Kahn permission to present either these tapes or transcripts of these tapes at professional meetings or for academic purposes.

Yes----------- No-----------

I understand that I may withdraw my participation at anytime. I, the undersigned, have understood the above explanation and give consent to my voluntary participation in Ruth Kahn's research project.

Date-----------

Location----------

Name of Parent (please print)

Witnessed by

Signature of Parent

Date

APPENDIX E

GENERAL DEMOGRAPHIC INFORMATION FORM

Child's name_______________Date of birth_______________

School attended_________________C.A.__________

Attended from_________to______Times per week____________

Parents names___________________Date of birth___________

___________________ ___________

Address____

Phone number____

Mother's occupation______________________________________

Father's occupation______________________________________

Other children in family (list names, sex, and birth dates)

____

____

____

____

____

Parental levels of schooling attained(circle)

	Mother		Father	
Completed grade school?	Yes	No	Yes	No
Attended High School?	Yes	No	Yes	No
Received diploma?	Yes	No	Yes	No
Technical training?	Yes	No	Yes	No

Beyond H.S. diploma?	Yes	No	Yes	No
Attended college?	Yes	No	Yes	No
Bachelor's degree?	Yes	No	Yes	No
Graduate studies?	Yes	No	Yes	No
Master's degree?	Yes	No	Yes	No
Ph.D. degree or other doctorate?	Yes	No	Yes	No

Annual income (circle) below 10,000 11,000 to 20,000 21,000 to 40,000 41,000 and above

Cognitive Home Environment Scale[1]

__________ 1. (When ________ starts to school.) What grades do you expect ________ to receive in most subjects? (circle one) A B+ B C+ C D+ F

__________ 2. What grades would satisfy you? (circle one) A B+ B C+ C D+ F

__________ 3. a) What towns has ________ visited outside of [his/her] town ?

b) Why was one of the recent trips not connected with school taken?

----

[1] Source: Norma Radin and Hanne Sonquist, Ypsilanti Public School and Gale Preschool Program Final Report, Appendix B, March 12, 1968. Only bracketed words have been added to the original instrument. The coding manual can be obtained by writing to Dr. Radin at the School of Social Work, in the University of Michigan, Ann Arbor.

c) Who went with him/her ?

d) What did [he/she] do there?

__________ 4. a) What newspapers and/or magazines do you have in your home at present?

b) Who reads them?

c) Does ________ usually look at them? (circle one) Y N

d) If so, which ones?

__________ 5. a) What did you get ________ on [his/her] last birthday?

b) For Christmas?

c) What would you like to get [him/her] for [his/her] next birthday or Christmas?

__________ 6. a) Does any member of your family have a public library card? (Circle one) Y N

b) How often is the card used? Once a week -- Once a month -- less often than once a month?

c) When was it used the last time?

__________ 7. Are any of these things available for _________ to use at home at present? (Check if yes)

a) ___ paste
b) ___ paper
c) ___ paints
d) ___ coloring books
e) ___ paper cut-outs
f) ___ books
g) ___ ruler
h) ___ crayons
i) ___ playdough
j) ___ scissors
k) ___ pencils
l) ___ other (specify)

__________ 8. a) Do you have a dictionary in your home?

(circle one) Y N

b) Who uses it?

c) How often? (circle one) Once a week--Once a month--less often Once a month--less often than once a month.

__________ 9. a) Do you have an encyclopedia in your home? (circle one) Y N

b) Who uses it?

c) How often? Once a week--once a month--less often than once a month.

__________10. a) Did you teach ________ to write [his/her] name? (circle one) Y N

b) To count? (circle one) Y N

c) To read? (circle one) Y N

d) All together, how much time do you (or your husband) spend trying to help ________ learn?

e) Do you play with ________? (circle one)

Y N

f) What do you play?

__________ 11. a) When does ________ usually eat dinner on weekdays?

b) Who eat with [him/her]? (Please list.)

c) Who does most of the talking at the table?

d) About what?

__________ 12. a) At what times are you together as a family on weekdays?

b) What are some of the things you do together at these times?

__________ 13. a) (If husband is in household) What are some of the things your husband does with ________ on weekdays?

b) On weekends?

__________ 14. a) Is there any adult outside of you (and your husband) that ________ is particularly friendly

with? (circle one) Y N

b) How often does -------- see [him/her] ?

c) What does -------- do when [he's/she's] with this friend?

__________ 15. a) Do you read books to _______? (circle one) Y N

b) If yes, what kind?

c) How often do you read to (him)?

d) How long does [he/she] listen?

__________ 16. a) Do you suggest that _______ watch any particular programs? (Circle one) Y N

b) If yes, which ones?

__________ 17. a) Have you tried to teach _______ new words? (circle one) Y N

b) Why?

c) If yes, when did you teach [him/her] a new word last?

d) What was the word?

_________ 18. a) Are you concerned about the way _______ talks? (circle one) Y N

b) If yes, in what way?

c) Have you tried to get (him) to change? (circle one) Y N

d) If so, how?

_________ 19. How much schooling would you like _______ to receive?

_________ 20. How much schooling do you expect _______ to receive?

__________ 21. What is the least amount of education you think ________ must have?

__________ 22. a) What kind of work do you think ______ will do when [he/she] grows up?

b) What kind of work would you like [him/her] to do?

__________ 23. a) What are some of the things ________ does that you approve of?

b) Does [he/she] know that you approve of them? (circle one) Y N

c) How do you show that you approve of them?

d) Did you praise or hug ________ in the last few days for something [he/she] did? (circle one) Y N

e) If yes, what was it that [he/she] did?

__________ 24. a) Do you want ________ to go to college? (circle one) Y N

b) If yes, how much do you think it will cost to send [him/her] to college? _____$ per year.

c) Have you made any plans for meeting this bill? (circle one) Y N

d) If yes, what are some of these plans?

BLOCK SORTING TASK TEST FORM

Child's Name____________________

Block sort task (circle one)	A	B
Teaching parent	Mother	Father
Session order	1st	2nd

Criterion measures	Score	
1. Correct placement of tall block by height	0	1
2. by shape or X mark	0	1
3. Correct placement of short block by height	0	1
4. by shape or O mark	0	1
5. Verbal explanation specifying tallness	0	1
6. Verbal explanation specifying shape or X mark	0	1
7. Verbal explanation specifying shortness	0	1
8. Verbal explanation specifying shape or O mark	0	1

Source: Shipman, V.C. et al., Disadvantaged children and their first school experiences: ETS - Headstart longitudinal study. Princeton, N.J.: Educational Testing Service, 1971.

APPENDIX F

Inter-Rater Reliability Study

The original intent of this study was to describe how parents and children interacted when they were engaged in a teaching/learning experiences, and to explore some of the behaviors that might be associated with the successful completion of a prescribed cognitively oriented task. Methdological issues were not regarded as the paramount interest but rather as a consideration neccessitated by the fact that no appropriate instrumentation had been established that could be used for the types of observations being planned. As it turns out methodological issues assumed a great deal of importance.

The instrument used for this investigation had been carefully selected after thoroughly reviewing a good deal of literature on observational systems and virtually all the available instruments that had been used for coding interactions between mothers and preschool children, and between teachers and young children (Kahn, 1976). The assumption was, that if an appropriate instrument whose reliability was well established was selected, that relatively few problems would be encountered in utilizing that instrument with a somewhat different population and under slightly different circumstances than its designers had envisioned. Lo and behold, as researchers everywhere have discovered, there are simple methodological decisions, and even fewer simple methodological solutions. The instrument had been modified slightly, data collection had begun and coding was underway when an inter-rater reliability study was undertaken. Unfortunately many of the predicted problems encountered in establishing reliability (Frick & Semmel, 1978; Herbert & Attridge, 1975; Medley & Mitzel, 1963) came into bold relief and some of the reasons why instrumentation for systematically observing parent/child dyads who are engaging in a teaching/learning interaction were scarce became frustratingly clear.

Because certain difficulties were encountered, this appendix contains a complete description and some discussion of the results of an inter-rater reliability study of the modified Columbia Instrument (Bellack et al., 1966).

The same 60 categories were used to code both the observational data collected for parents and for their children. Intraclass correlation coefficients (r) for the inter-rater reliability study were calculated for a total of 120 variables. Some of the categories observed occurred infrequently in the reliability data and/or their distributions were skewed. The mean frequencies and standard deviations for the behavioral categories coded for the inter-rater reliability study are provided in Tables 82 through 87. For all these tables the percentages, unless otherwise noted, were calculated by dividing the total number 8 specific behaviors coded for each member of the dyad by the total numb r of moves coded for that dyad member (e.g., number of STR moves by child/number of all moves by child). Each facet of the observation system is underlined and the categories it subsumes are listed below it. Subcategories of major categories are indented to identify them more clearly.

Table 82

Means and Standard Deviations of Behaviors Coded by Two Sets of Coder/Reviewer Teams for the Pedagogical Moves Facet

CATEGORY	PARENTS Mean	PARENTS SD	CATEGORY	CHILDREN Mean	CHILDREN SD
Proportion of Pedagogical Moves **	59% 59%	7% 8%	Proportion of Pedagogical Moves**	41% 41%	7% 9%
Number of Words Per Move **	5.8 5.7	1.3 1.3	Number of Words Per Move **	2.6 2.5	1.4 1.4

Linguistic Form of Pedagogical Moves

STRucturing *	7% 7%	6% 6%	STRucturing	1% 2%	2% 3%
SOLiciting **	48% 48%	11% 11%	SOLiciting **	15% 15%	11% 12%
Tag Ques- tions **	4% 4%	4% 4%	Tag Ques- tions *	.5% .6%	1% 1%
RESponding **	6% 6%	8% 7%	RESponding **	48% 49%	17% 21%
REActing *	39% 39%	8% 9%	REActing *	37% 35%	13% 19%
Initiatory Moves **	55% 55%	12% 11%	Initiatory Moves **	16% 17%	13% 14%
Reactive Moves **	45% 45%	12% 11%	Reactive Moves **	84% 83%	13% 14%
Nonverbal Moves **	.4% .6%	1% 1%	Nonverbal Moves **	18% 18%	18% 18%

Note. Percentages were calcuated by dividing the total number of specific behaviors coded for each member of the dyad by the total number of moves coded for that dyadic member (e.g., Number of STR moves per child/number of moves per child.) Each facet is a composite of the categories listed below it, and is underlined. The sub-categories under major categories are indented.

The percentages for the proportion of pedagogical moves was calculated by dividing the total number of moves coded for each group member by the total number of moves coded for that dyad (e.g.,. Number of pedagogical move for mother/the sum of the pedagogical moves for mother and child).

** = Reliable variables (intraclass correlation coefficient .70 or above).

* = Tenuously reliable variable (Spearman Brown prophecy correlation coefficient .75 or above).

No * = Adequate reliability could not be established.

Table 83

Means and Standard Deviations of Behaviors Coded by Two Sets of Coder/Reviewer Teams for the Substantive Meanings Facet

CATEGORY	PARENTS Mean	PARENTS SD	CATEGORY	CHILDREN Mean	CHILDREN SD
SUBSTANTIVE MEANING **	69% 69%	20% 20%	SUBSTANTIVE MEANING **	62% 60%	27% 27%
Socio-Emotional Knowledge *	3% 5%	3% 5%	Socio-Emotional Knowledge *	2% 3%	4% 4%
Achievement *	2% 3%	3% 3%	Achievement **	2% 2%	3% 4%
Interpersonal Relationships	3% 3%	3% 3%	Interpersonal Relationships *	2% 3%	4% 4%
Physical Knowledge *	41% 38%	17% 19%	Physical Knowledge *	36% 31%	21% 18%
Object Attributes *	19% 10%	15% 7%	Object Attributes **	18% 15%	14% 12%
Action on or by Objects	5% 3%	6% 6%	Action on or by Objects	6% 4%	9% 9%
State-Object Relationships **	17% 16%	14% 13%	State-Object Relationships	13% 11%	13% 12%
Operational	25%	21%	Operational	23%	21%

Knowledge **	27%	24%	Knowledge **	27%	26%
Causality	.2%	.6%	Causality	.1%	.7%
	.6%	2.5%		.2%	.8%
Representation **	19%	13%	Representation **	10%	15%
	19%	14%		12%	18%
Classification **	12%	16%	Classification ***	10%	17%
	13%	21%		12%	20%
Numerical Relationships **	4%	6%	Numerical Relation ships *	3%	5%
	4%	5%		3%	5%

Note. Percentages were calculated by dividing the total number of specific behaviors coded for each member of the dyad by the total number of moves coded for that dyadic member (e.g., Number of moves referring to Classification per child/number of moves per child). Each facet is a composite of the categories listed below it, and is capitalized. The sub-categories under major categories are indented.

** = Reliable variables (Intraclass correlation coefficient .70 or above).

* = Tenuously reliable variables (Spearman Brown prophecy correlation coefficient .75 or above).

No * = Adequate reliability could not be established.

Table 84

Means and Standard Deviations of Behaviors Coded by Two Sets of Coder/Reviewer Teams for the Substantive-Logical Meanings Facet

CATEGORY	PARENTS Mean	PARENTS SD	CATEGORY	CHILDREN Mean	CHILDREN SD
SUBSTANTIVE-LOGICAL MEANING *	32% 31%	15% 18%	SUBSTANTIVE-LOGICAL MEANING **	34% 34%	22% 23%
Analytical Processes *	8% 7%	7% 7%	Analytical Processes **	12% 11%	14% 12%
Empirical Processes *	22% 22%	13% 12%	Empirical Processes **	21% 22%	15% 15%
Fact-stating	15% 15%	9% 9%	Fact-stating **	13% 14%	11% 11%
Nonverbally Demonstrating	2% 2%	3% 3%	Nonverbally Demonstrating	5% 5%	6% 8%
Verbally Demonstrating *	2% 1%	3% 2%	Verbally Demonstrating *	1% 1%	2% 2%
Explaining **	3% 3%	5% 5%	Explaining	2% 1%	4% 2%
Evaluating Processes	2% 2%	3% 4%	Evaluating Processes	2% 1%	3% 3%
Providing or Requesting Substantive	29% 29%	14% 16%	Providing or Requesting Substantive	33% 33%	22% 22%

Information *	Information **

Note. Percentages were calculated by dividing the total number of specific behaviors coded for each member of the dyad by the total number of moves coded for that dyadic member (e.g., Number of Analytical Process moves per child/number of moves per child). Each facet is a composite of the categories listed below it, and is capitalized. The sub-categories under major categories are indented.

** = Reliable variables (Intraclass correlation coefficient .70 or above).

* = Tenuously reliable variables (Spearman Brown prophecy correlation coefficient .75 or above).

No * = Adequate reliability could not be established.

Table 85

Means and Standard Deviations of Behaviors Coded by Two Sets of Coder/Reviewer Teams for the Instructional Meanings Facet

CATEGORY	PARENTS Mean	SD	CATEGORY	CHILDREN Mean	SD
INSTRUCTIONAL MEANING **	78%	14%	INSTRUCTIONAL MEANING **	68%	18%
	80%	14%		68%	19%
Statements **	18%	10%	Statements *	11%	8%
	17%	9%		13%	9%
Materials	5%	6%	Materials *	4%	6%
	9%	11%		6%	8%
Persons *	2%	3%	Persons **	1%	4%
	1%	2%		1%	2%

Actions and Procedures **	54% 53%	18% 18%	Actions and Procedures **	51% 46%	18% 20%
Cognitive Actions **	2% 3%	3% 4%	Cognitive Actions *	3% 2%	3% 3%

Note. Percentages were calculated by dividing the total number of specific behaviors coded for each member of the dyad by the total number of moves coded for that dyadic member (e.g., Number of moves referring to Statements per child/number of moves per child). Each facet is a composite of the categories listed below it. and is capitalized. The sub-categories under major categories are indented.

** = Reliable variables (Intraclass correlation coefficient .70 or above).

* = Tenuously reliable variables (Spearman Brown prophecy correlation coefficient .75 or above).

No * = Adequate reliability could not be established.

Table 86

Means and Standard Deviations of Behaviors Coded by Two Two Sets of Coder/Reviewer Teams for the Instructional Meanings Facet

CATEGORY	PARENTS Mean	SD	CATEGORY	CHILDREN Mean	SD
INSTRUCTIONAL LOGICAL MEANING *	56% 59%	13% 16%	INSTRUCTIONAL-LOGICAL MEANING *	42% 42%	14% 21%
Analytical	1%	3%	Analytical	.5%	2%

Processes	1%	3%	Processes *	1%	2%
Empirical Processes *	18% 19%	11% 11%	Empirical Processes *	18% 18%	11% 12%
Fact-stating	14% 15%	9% 10%	Fact-stating *	10% 11%	9% 10%
Nonverbally Demonstrating *	.7% .6%	1% 1%	Nonverbally Demonstrating	6% 5%	7% 7%
Verbally Demonstrating *	1% 1%	2% 3%	Verbally Demonstrating *	1% 1%	3% 2%
Explaining *	3% 2%	4% 4%	Explaining *	1% 1%	3% 2%
Evaluating Processes **	37% 39%	12% 12%	Evaluating Processes **	24% 24%	12% 13%
Opining **	14% 14%	8% 7%	Opining **	4% 5%	6% 6%
Ratings **	23% 24%	8% 7%	Ratings **	17% 18%	11% 12%
Positive Rating **	17% 18%	8% 8%	Positive Rating **	14% 13%	10% 12%
Negative Ratings **	5% 6%	4% 4%	Negative Ratings *	3% 4%	4% 5%
Neutral Ratings *	.6% 1%	1% 1%	Neutral Ratings *	.4% .7%	1% 2%
Providing Instructional Information *	19% 20%	10% 12%	Providing Instructional Information *	19% 19%	12% 12%

Providing Information (regardless of content) *	49% 49%	13% 16%	Providing Information (regardless of content) **	51% 51%	25% 23%

Note. Percentages were calculated by dividing the total number of specific behaviors coded for each member of the dyad buy the total number of moves coded for that dyadic member (e.g., Number of Rating moves per child/number of moves per child). Each facet is a composite of the categories listed below it. and is capitalized. The sub-categories under major categories are indented.
aIINFO=Providing or requesting instructional information
bINFO=Providing or requesting information. regardless of content area referred to.
** = Reliable variables (Intraclass correlation coefficient .70 or above).
* = Tenuously reliable variables (Spearman Brown prophecy correlation coefficient .75 or above).
No * = Adequate reliability could not be established.

Table 87

Means and Standard Deviations for Behaviors Coded of Two Sets of Coder/Reviewer Teams for the Extra-Logical Meanings Facet

CATEGORY	PARENTS Mean	SD	CATEGORY	CHILDREN Mean	SD
EXTRA-LOGICAL PROCESSES **	21% 21%	13% 13%	EXTRA-LOGICAL PROCESSES **	23% 23%	17% 17%
Initiatory Extra-Logical Processes **	20% 20%	13% 13%	Initiatory Extra-Logical Processes **	7% 6%	6% 6%

Reactive	1%	1%	Reactive	18%	18%
Extra-Logical Processes	1%	3%	Extra-Logical Processes **	18%	18%
Giving	19%	13%	Giving	4%	4%
Orders **	18%	12%	Orders **	3%	3%
Compliance *	.6%	1%	Compliance *	12%	12%
	.5%	1%		12%	13%
Non-	0%	0%	Non-	5%	17%
compliance	.1%	.5%	compliance **	5%	15%

Note. Percentages were calculated by dividing the total number of specific behaviors coded for each member of the dyad by the total number of moves coded for that dyadic member (e.g., Number of Compliance moves per child/number of moves per child). Each facet is a composite of the categories listed below it, and is capitalized. The subcategories under major categories are indented.

** = Reliable variables (Intraclass correlation coefficient .70 or above).

* = Tenuously reliable variables (Spearman Brown prophecy correlation coefficient .75 or above).

No * = Adequate reliability could not be established.

Reliability for coding the types of pedagogical moves and number of words per move.

Although the procedures utilized for establishing interrater reliability for this study were more stringent and comprehensive than the percentage of rater agreement for major facets that were reported by Bellack et al. (1966) or Neujahr (1976), certain comparisons can be made. In all three studies, determining move boundaries was found to be highly reliable. Both Bellack et al. and Neujahr reported that their percent agreement for all pedagogical moves, across all speakers, was 94%; however, this figure reflects agreement on the boundaries of the moves, as well as agreement on the types of pedagogical moves. In the study being reported here, move boundary agreement was estimated by related the proportion of moves coded for each member of the dyad (r = .90). Agreement for pedagogical move types (i.e., the linguistic forms), were calculated separately for the major types of moves that were coded. As can be seen from table 88 below, the results for separate calculations of inter-rater reliability for each of the pedagogical move types provided a less optimistic view than previously reported figures had indicated.

Table 88

Reliability for the Proportions of Pedagogical Move Types and Number of Words Coded by Two Coder/Reviewer Teams

CODED VARABLE	PARENT BEHAVIOR Intra-class	PARENT BEHAVIOR Spearman Brown	CHILD BEHAVIOR Intra-class	CHILD BEHAVIOR Spearman Brown
	Correlation Coefficients			
Mean number of	.90	.99	.90	.99

pedagogical moves				
Mean number of words per move	.91	.99	.97	.99
Linguistic Form of Pedagogical Moves				
STRucturing moves	.23	.75	.06	.39
SOLiciting moves	.73	.96	.93	.99
Tag Questions	.82	.98	.64	.95
RESponding moves	.91	.99	.78	.97
REActing moves	.46	.89	.63	.94
Initiatory moves (SOL & STR)	.71	.96	.88	.99
Reactive moves (RES & REA)	.71	.96	.88	.99
Nonverbal moves	1.16	.92	.95	.99

NOTE. Variables with an intraclass correlation coefficient of .70 or above are considered reliable measures. Those variables with intraclass correlation coefficients of .69 or below, but which obtained correlations of .75 or above, using the Spearman Brown propnecy formula, are considered tenuously reliable measures. Variables with Spearman Brown prophecy correlations of .74 or below are considered unreliable.

Bellack et al. (1966) had calculated inter-rater agreements for the number of moves and the number of lines coded for each facet of the system. As is discussed elsewhere (see Appendix A for modifications of number of lines), the prescnoolers observed for this study, often uttered only one, two, or three word phrases and rarely spoke more than one line of typescripting per move. For this reason, the number of lines was not regarded as a useful measure and instead the number of words per move were counted. Agreement on the *mean number of words per move* provides an additional measure for estimating the boundary agreements of pedagogical moves. The intraclass correlation coefficients of .91 for parents and .97 for children, obviously support the notion that the length of moves can be reliably determined. These figures compare favorably to the 93% agreement on number of lines per move that Bellack et al. (1966) had obtained.

As can be seen on Table 98 above, *parent's soliciting* and *children's soliciting* (*r* = .73 and *r* = .93, respectively), as well as *parent's responding* and *children's responding* (*r* = .91 and *r* = .78, respectively) were reliably measured. The coding of *tag questions* was reliable for parents (*r* = .82), but only tenuously reliable for children (*r* = .64), who did not engage in this behavior very often. The moves coded as *reacting* were only tenuously reliable for both members of the dyads (for parent's *r* = .46; for children *r* = .63). *Structuring* moves, which were relatively infrequent (mean frequency for parents = 3, mean frequency for children = .37), and whose distribution was positively skewed, were tenuously reliably coded for parents, but proved to be an unreliable measure for their children (*r* = .23 and *r* = .06, respectively). The coding of *nonverbal* moves was highly reliable for both parents (*r* = 1.16) and for children (*r* = .95), although it was relatively infrequently coded for parents.

Since Bellack et al. had reported some data on the occurrences of initiatory and reactive moves, the reliability for both of these composite categories was calculated. Initiatory moves consist of all of the structuring and soliciting moves combined and was reliable for both parents and children (r = .71 for parents, r = .88 for children). Reactive moves, which represent the combining of all the responding and reacting moves, were just as reliable as initiatory moves (r = .71 for parents, r = .88 for children).

The lack of clear-cut reliability for reacting moves and for parents' structuring moves, and the total lack of reliability for the coding of children's structuring moves is partially attributable to the complexity of the language behavior that was being coded for this study. Structuring moves were not only the least frequently utilized linguistic form for pedagogical moves, but also were the most difficult to code. In a classroom situation, structuring moves are generally presented in a more formal and direct manner, and therefore are less likely to be ambiguous or confusing. During the parent/child interactions that were observed for this study, there were few instances of "And now we will...", or "It's now time to...", or "It's time to stop working on...". Instead, parents, and occasionally children, couched their efforts to initiate or halt activities in such benign terminology as "Why don't we...

now", or "Let's...", or "How about if we...", or "I'll bet you can't...". Parents and children also tended to embed structuring moves in reacting moves. Often when one member of the dyad was performing a task, the other member might clarify or expand the task requirements of the ongoing performance. e.g.. "That's not the way to do it.", "You can stack them instead.", "Why don't you try putting them in groups of two." On one hand, such moves could be interpreted as evaluations of the performance. in which case they would be considered reacting moves. On the other hand, they could be viewed as restructuring the performance either by halting it, initiating a new direction, or by specifying what was to be done. Bellack et al. (1966) had also encountered difficulties in coding structuring moves and warned that reacting and structuring moves were susceptible to being confounded.

In an effort to better understand the sources of the confusion between structuring and reacting moves, the frequencies of agreements and disagreements for these moves were tallied. The tallying revealed that not only were structuring and reacting moves confused with one another, but that boundary disagreements were also most likely to occur for both of these moves. Clearly, if one coder omits just one or two of the infrequently occurring structuring moves, even though there was agreement on three other structuring moves, reliability would be seriously jeopordized. Coding two moves, when the other coder only codes one long reacting move, would also affect the level of reliability that could be obtained for that category. Neujahr (1976) avoided this difficulty by counting as agreements only those moves for which the boundaries and the pedagogical move type were coded identically. He counted as disagreements, for the reliability of pedagogical moves, only those moves whose boundaries were agreed upon but whose pedagogical move type had been coded differently. While this practise had a positive effect on the reliability levels he obtained, it does not adequately reflect the actual problems encountered when using this observation system. It appears that if this observation system continues to be utilized, the operational definitions and the examples provided for both structuring and reacting moves will need to be further expanded and clarified. In addition, future users should assess the reliability of each individual category, rather than only calculating the reliability for coding the pedagogical move type facet. Furthermore, for establishing inter-rater reliability, pooling data across categories and speakers should be avoided. While combining individual categories may be useful for certain aspects of any study, the reliability difficulties encountered with structuring and reacting moves indicate that combining pedagogical move types may be misleading.

It would be remiss not to note that the reliability difficulties that were encountered are partially the result of the operational definitions and the coding instructions that were originally developed. Although some examples were provided, they were generally unambiguous samples that did not adequately prepare prospective users for the more common, and far less clear-cut verbalizations that were actually encountered The manual provided in this report (see appendix B??) has been expanded to include clarifications provided by Neujahr (1976) and by this author. It contains a great many examples, many of which represent decision making dilemnas.

For this reliability study, moves whose boundries or whose linguistic form had not been agreed upon were not excluded when the subsequent reliability computations for the remaining categories were calculated. Therefore, it is important to note that all the subsequent reliability coefficients include in their error terms any disagreements that occurred on the total number of moves, the move boundaries, and/or the coding of the linguistic forms of pedagogical move, as well as disagreements on the occurrence, or non-occurrance, of substantive or instructional meanings.

Reliability for coding substantive meanings.

It appears that references to <u>substantive content</u> can be coded reliably. Bellack et al. (1966), who had used a specific set of economics lessons and coded the substantive meanings in terms of the various aspects of the subject matter that were covered in the prepared lessons, obtained inter-rater agreement of 95% for the substantive meanings facet. Neujahr (1976) observed classes in mathematics, science, and social studies. He did not code the specific content referred to, instead he coded whether or not the substantive meanings expressed were relevant to the content of the ongoing lessons. Using only those moves for which the linguistic form of the pedagogical move had been agreed upon, he found that his inter-rater agreements ranged from 90% to 100% for all of the remaining major facets (i.e., substantive meanings, substantive-logical meanings, instructional meanings, and instructional-logical meanings).

As can be seen on Table 89 below, references to substantive meaning were reliably coded for parents and their children (r = .79 and r = .85, respectively). As was true for pedagogical move types, when the individual categories under the facet of substantive meanings were investigated, rather than just the major facet the results were more sobering.

Table 89

Reliability for the Proportion of Substantive Meanings Coded

by Two Coder/Reviewer Teams

CODED VARIABLE	PARENT BEHAVIOR Intra-class	PARENT BEHAVIOR Spearman Brown	CHILD BEHAVIOR Intra-class	CHILD BEHAVIOR Spearman Brown
	Correlation Coefficients			
References to Substantive Content	.79	.97	.85	.93
Socio-Emotional Knowledge	.21	.73	.51	.91
Achievement	.64	.95	.73	.96
Interpersonal Relationships	.16	.66	.51	.91
Physical Knowledge	.43	.88	.55	.92
Objects and their Attributes	.41	.87	.75	.97
Actions By or With Objects	.10	.69	.10	.53
State-Object Relationships	.85	.98	.85	.98
Operational Knowledge	.79	.97	.86	.98
Causality	.03	.24	-.04	NA[a]
Representation	.79	.97	.88	.99
Classification	.68	.99	.92	.99
Numerical Relationships	.81	.98	.66	.95

Note. Variables with an intraclass correlation coefficient of .70 or above are considered reliable measures. Those variables with intra-class correlation coefficients of .69 or below, but which obtained correlations of .75 or above, using the Spearman Brown prophecy formula, are considered tenuously reliable measures. Variables with Spearman Brown prophecy correlations of .74 or below are considered unreliable.

aNA = Not applicable because of the low frequency of occurrence

The major category of socio-emotional knowledge was only tenuously reliable for parents (r = .21) and for their children (r = .51) and was relatively infrequently coded for either members of the dyads. Out of the two sub-categories, included under the substantive meanings category of Socio-Emotional Knowledge, only references to achievement by children was reliable (r = .73). For parents, references to achievement were only tenuously reliable (r = .64). References to interpersonal relationships were not reliably coded for parents (r = .16), in part because they occurred very infrequently. For children the interpersonal relationships category was tenuously reliably coded r = .51).

The major category for physical knowledge references was tenuously reliable for both parents and their children (r = .43 and r = .55, respectively). For the three sub-categories of Physical Knowledge, reliability levels varied considerably. References to objects and their attributes were tenuously reliable for parents (r = .41): however. for children this sub-category was reasonably reliable (r =

.75). _Actions by or with objects_ was not found to be reliable for either parents or their children (_r_ = .16 and .10, respectively). In retrospect, it seems that parents and children generally offered directives for what was to be done (these were coded as having instructional meaning in the action and/or procedure category), rather than describing or explaining how things can or should be done. It is possible that if a structured, unfamiliar, construction task had been observed, this category would have occurred more frequently and therefore been more reliably coded. A relatively large proportion of the cognitively oriented content (i.e., substantive meanings) was devoted to references about _state-object relationships_, particularly spatial relationships. The coding of state-object relationships was quite reliable both for parents and for their children (_r_ = .85 for both).

Operational knowledge was the only major category in the substantive meanings facet that was clearly reliable (for parents _r_ = .79 and for children _r_ = .86). The individual sub-categories it subsumed also tended to be quite reliable. References to _representation_ (for parents, _r_ = .79; for children, _r_ = .68) and to _classification_ (for parents, _r_ = .88; for children, _r_ = .92) were clearly reliable. _Numerical relationships_ were somewhat less frequently referred to. While this category was reliably coded for parents (_r_ = .81), it was only tenuously reliably coded for children (r = .66). *Causality* was almost never directly referred to and therefore reliability could not be established for this category, for parents and for their children the r was essentially 0.

The most frequently occurring and reliable sub-categories of the substantive meanings facet were those content areas that had been directly elicited during the prescribed block sorting task (i.e., correspondence, representation, and object attributes). It appears evident that the reliability of content categories will differ in conjuction with observations of different tasks and/or different situations. It therefore seems likely that comparisons between studies will have to be made in terms of the major facet of substantive meanings, while individual category comparisons will have to be limited to replication studies.

Reliability for coding substantive-logical meanings.

In general, the substantive-logical meanings facet and the instructional-logical meanings facet tended be less reliably coded than either of the content facets (i.e., the substantive meanings facet or the instructional meanings facet), particularly for parent behaviors.

Table 90

Reliability for the Proportion of Substantive-Logical Meanings Coded by Two Coder/Reviewer Teams

CODED VARIABLE	PARENT BEHAVIOR Intra-class	PARENT BEHAVIOR Spearman Brown	CHILD BEHAVIOR Intra-class	CHILD BEHAVIOR Spearman Brown
	Correlation		Coefficients	
Substantive Logical Meaning was coded	.44	.80	.81	.98
Analytical Processes (Defining & Interpreting)	.60	.94	.82	.98
Empirical Processes	.43	.88	.88	.99
Fact-Stating	.17	.67	.77	.97
Nonverbally Demonstrating	.03	.24	.02	.17
Verbally Demonstrating	.36	.85	.42	.88
Explaining	.86	.98	.15	.64
Evaluative Processes (Opining & Justifying)	-.05	NAa	.02	.17
SINFCB	.51	.91	.84	.98
Asks Substantive Questions	.71	.96	.80	.98
Responds Substantively	.57	.93	.72	.96

Note. Variables with an intraclass correlation coefficient of .70 or above are considered reliable measures. Those variables with intraclass correlation coefficients of .69 or below, but which obtained correlations of .75 or above, using the Spearman Brown prophecy formula, are considered tnuously reliable measures. Variables with Spearman Brown Prophecy correlations of .74 or below are considered unreliable.

[a]NA = Not applicable because of the low frequency of occurrence.

[b]SINFO = Providing or requesting substantive information.

Although the substantive-logical meanings facet was reliable for children (r = .81), it proved to be only tenuously reliable for parents (r = .44). If one looks at the three process categories (see Table 90 above), it is clear that children were reliably coded for analytical processes (r = .82), and for empirical processes (r = .88), but were unreliably coded for their rarely expressed evaluating processes (r = .02). Parents' analytical Processes (r = .60) and their empirical processes (r = .43) were tenuously reliable. Their rare use of evaluating processes in conjuction with cognitively oriented content (r = -.05) could not be coded reliably.

When the individual sub-categories for the communicative functions of parent and child behaviors are considered, further discrepancies in reliability levels are evident. Instances of interpreting were rare, and were combined with defining denotatively and connotatively when the data was entered in the computer. (See Appendix A for "Descriptions of and Rationales for Modifications of The Columbia Instrument".) As a result of this procedure there are no individual categories under analytical processes to report on. Empirical processes subcategories had not been combined at the data entry stage and those categories are revealing. *Fact-stating* was not reliable for parents (*r* = .17), but was reliable for childen (*r* = .77). *Nonverbally demonstrating*, a category added for this study, was infrequently coded and unreliable for parents and their children (*r* = .03 and *r* = .02, respectively). *Verbally demonstrating*, also added for this study, was not frequently coded, but was at least tenuously reliable for parents (*r* = .36) and for children (*r* = .42). *Explaining*, a somewhat more frequent behavior by parents than demonstrating of any sort, was quite reliably coded for parents (*r* = .86), but was infrequently and unreliably coded for children (*r* = .15).

Certain composites of categories were created in order to help clarify the verbal-logical behaviors observed. A variable which combined the occurances of analytical and empirical processes was named *providing or requesting substantive information* (SINFO). Reliability for this variable was high for children (*r* = .84), but only tenuous for parents (*r* = .51). Asking questions which focused on substantive meaning (ASKSBS) was reliably coded for parents (*r* = .71) and for children (*r* = .80). Responding with substantive meaning (ANSSBS) was only tenuously reliable for parents (*r* = .57), although it was reliable for children (

r = .72).

One of the major problems that arose in coding the processes which comprised the substantive-logical meaning facet was differentiating between the communicative functions of fact-stating and defining behavior, a problem Bellack et al. (1966) had also experienced. This problem is most effectively solved by providing numerous examples of ambiguous moves as training items, after the non-ambiguous moves have been mastered.

Again it seems apparent that the utilization of reliability figures computed for facets or major categories across all observed participants is misleading. (Bellack et al. had obtained 68% inter-rater agreement for substantive-logical meanings). Furthermore, such a procedure does not allow researchers to make certain potentially meaningful comparisons (e.g., Are teachers' explaining moves clearer and therefore more reliably coded, than parents' explaining moves; Does the age group of the child and the consequent modification of syntax and vocabulary detract from the clarity and subsequent coding reliability of particular communicative functions categories such as fact-stating, defining, etc.).

Reliability for coding instructional meanings.

The *instructional meanings* facet was reliable for both parents and children (r = .72 and r = .75, respectively); however, as can be seen on Table 91 below, the individual categories varied in their reliability levels.

Table 91

Reliability for the Proportion of Instructional Meanings

Coded by Two Teams of Coder/Reviewers

	PARENT BEHAVIOR		CHILD BEHAVIOR	
CODED VARIABLE	Intra-class	Spearman Brown	Intra-class	Spearman Brown
	Correlation Coefficients			
References to Instruct'l Content	.72	.96	.75	.97
Statements	.76	.97	.61	.94
Materials	.11	.55	.26	.78
Persons	.37	.86	.79	.97
Actions and/or Procedures	.81	.98	.77	.97
Cognitive Actions	.76	.97	.67	.95

Note. Variables with an intraclass correlation coefficient of .70 or above are considered reliable measures. Those variables with intraclass correlation coefficients of .69 or below, but which obtained correlations of .75 or above, using the Spearman Brown prophecy formula, are considered tenuously reliable measures. Variables with Spearman Brown prophecy correlations of .74 or below are considered unreliable.

References to *statements*, which included *repetions*, *expansions*, and *alterations* of statements, as well as general references to statements, was reliably coded for parents (r = .76), but was only tenuously reliable for children (r = .61). The action and procedure categories had been combined (see Appendix A) since they frequently overlapped and were confused with one another. References to *actions and/or procedures* by parents and their children were reliably coded (r =.81 and r = .77, respectively). The sub-category of references to *cognitive actions*, which was of particular interest, and was not confused with references to procedures, was reliable for parents (r = .78) but only tenuously reliable for children (r = .67). Although references to *persons* were infrequent, especially for dyads with normally developing children, such references were tenuously reliable for parents as a total group (r = .77) and reasonably reliable for children (r = .79). References to the *materials* being used for instructional purposes were infrequent and unreliable for parents (r = .11). Although equally infrequent, children's references to materials were tenuously reliably coded (r = .26). Materials proved to be a confusing category for this study because, for the most part, the materials being referred to were the toys being used during the semi-structured free-play activity. References to those toys usually involved discriptions relating to their attributes and therefore were coded as referring to the object attributes category of the substantive content facet. In classroom situations where textbooks, maps, audio-visual materials, etc. are being used this category could probably be reliably coded as having instructional meaning.

Reliability for coding instructional-logical meanings.

Bellack et al. (1966) had reported an inter-rater agreement of 87% for the coding of the instructional-logical meanings facet. As can be seen on Table 92 below, the results obtained for this study are generally less positive.

Table 92

Reliability for the Proportion of Instructional-Logical Meanings Coded by Two Coder/Reviewer Teams

CODED VARABLE	PARENT BEHAVIOR Intra-class	PARENT BEHAVIOR Spearman Brown	CHILD BEHAVIOR Intra-class	CHILD BEHAVIOR Spearman Brown
	Correlation Coefficients			
Instructional-Logical Meaning was coded (includes Ratings)	.ll	.94	.69	.96

Analytical Processes(Defining)	.13	.60	.44	.89
Empirical Processes	.31	.82	.30	.81
Fact-Stating	.15	.64	.55	.92
Nonverbally Demonstrating	.37	.85	.15	.64
Verbally Demonstrating	.32	.82	.56	.93
Explaining	.62	.94	.52	.92
Evaluating (Opining)	.74	.97	.79	.97
Ratings	.87	.99	.73	.96
Positive	.91	.99	.77	.97
Negative	.82	.98	.56	.93
Neutral	.69	.96	.45	.81
IINFO[a]	.29	.80	.34	.84
INFO[b]	.64	.95	.84	.98

Note. Variables with an intraclass correlation coefficient of .70 or above are considered reliable measures. Those variables with intraclass correlation coefficients of .69 or below, but which obtained correlations of .75 or above, using the Spearman Brown prophecy formula, are considered tenuously reliable measures. Variables with Spearman Brown prophecy correlations of .74 or below are considered unreliable.
[a]IINFO = Providing or requesting instructional information.
[b]INFO = Providing or requesting information, regardless of content being referred to.

Although coding for the occurrence of instructional-logical processes appears to be somewhat more reliable for parents (r = .61) than coding their substantive-logical processes, the instructional-logical meanings facet was nevertheless still only tenuously reliable for parents. Children, for whom substantive-logical processes had been reliably coded, were also only tenuously reliably coded for their use of instructional-logical meanings (r = .69). Furthermore, the inter-rater reliability coefficients, for the behavioral subcategories indicate that any reliability for the instructional-logical meanings facet for parents, or children, is largely attributable to the high reliability for coding parents' evaluating processes (r = .82), or for coding childen's evaluating processes (r =.76). Analytical processes were unreliable for parents (r = .13), but were tenuously reliable for children (r = .44). Empirical processes were tenuously reliable for both parents (r = .31) and for children (r = .30).

Within the empirical processes category, the sub-category for fact-stating behavior was unreliable for parents (r = .15) and only tenuously reliable for children (r = .55). The reliability for parents' infrequently coded nonverbally demonstrating was tenuous (r = .37). Children rarely engaged in nonverbally demonstrating and were not reliably coded (r = .15) for this behavior (see Table ?? 104 for frequencies). Verbally demonstrating was tenuously reliable for both parents and their children (r = .32 and r = .56, respectively).

Collapsing the informationally oriented categories of analytical and empirical processes (IINFO) resulted in establishing only tenuous reliability for the variable labeled *providing or requesting instructional information* (for parents' r = .29, and for children r = .35).

The sub-categories subsumed under evaluating processes were almost all found to be reliable. *Opining* by parents (r = .74) and children (r = .79) were both reliably coded. *Rating* behavior, without regard to the type of ratings involved, were reliably coded for parents (r = .87) and for children (r = .73). *Positive ratings*, which are the most frequent types of ratings, were reliably coded for parents (r = .91) and for their children (r = .77). *Negative ratings* were reliably coded for parents (r = .82), but only tenuously reliably coded for children (r = .56), who were less likely to make direct negative rating comments. *Neutral ratings* occur very infrequently, and therefore only tenuous reliability could be established for parents (r = .69), and no reliability could be established for children (r = .45) (see Table ?? 104 for frequencies).

It appeared possible that substantive-logical and instructional-logical meanings might have been coded interchangeably in certain instances, and therefore, a variable for measuring informing behavior which was not contingent on content areas was created. This variable, called *providing or requesting information* (INFO), combined all coded instances of analytical and empirical process moves, regardless of whether instructional content and/or substantive content were referred to. Although this variable was found to be only tenuously reliable for parents (r = .64), the reliability was somewhat better than for parents' providing or requesting substantive information, and considerably better than for parents' providing or requesting instructional information. Coding children's informing behavior (i.e., providing or requesting information regardless of content areas, INFO), was found to be exactly as reliable (r = .34) as their providing or requesting substantive information (SINFO), and far more reliable than their providing or requesting instructional information (IINFO). These results seem to confirm the suspicion that the reliability of logical meaning categories is somewhat confounded by the content area that is coded and that the differences between substantive and instructional content need further clarification when non-classroom and/or non-academic situations are being observed.

Reliability for coding extra-logical meanings.

Coding of extra-logical meanings was not reported on separately by Bellack et al. or Neujahr. Instead, this set of subcategories was included when the reliability for the instructional-logical meanings facet was determined. As the results of the reliability study being reported here clearly demonstrate it is grossly misleading to incorporate the less complex and more reliably coded extra-logical behaviors with the more complex and less reliably coded instructional-logical behaviors. from which cognitive processes are to be inferred.

Table 93

Reliability for the Proportion of Extra-Logical Meanings Coded by Two Coder/Reviewer Teams

CODED VARIABLE	PARENT BEHAVIOR Intra-class	PARENT BEHAVIOR Spearman Brown	CHILD BEHAVIOR Intra-class	CHILD BEHAVIOR Spearman Brown
	Correlation Coefficients			
Extra-Logical Processes occurred	.79	.97	.77	.97
Initiatory Extra-Logical processes	.66	.98	.65	.95
Giving Orders	.67	.99	.62	.94
Reactive Extra-Logical processes	.13	.16	.82	.98
Compliance	.49	.90	.64	.95
Noncompliance	-.02	NA	.97	.99

Note. Variables with an intraclass correlation coefficient of .70 or above are considered reliable measures. Those variables with intraclass correlation coefficients of .69 or below, but which obtained correlations of .75 or above, using the Spearman Brown prophecy formula, are considered tenuously reliable measures. Variables with Spearman Brown prophecy correlations of .74 or below are considered unreliable.
NA = Not applicable because of the low frequency of occurrence

Table 93 above shows that coding for the occurrance of extra-logical moves was reliable for both parents (r = .79) and for their children (r = .77). Those extra-logical behaviors which are initiatory in nature (PRF. AGN, DIR, RPR, ALT, and PRO) were combined for the reliability study since it had been reported that these individual extra-logical categories occurred infrequently and were subject to decidedly skewed distributions (Neujahr, 1976)[1]. Reactive Extra-Logical behaviors (CPL, ALW, JOK, WPL, and NCM) were combined for the same reasons.

Initiatory extra-logical processes were reliably coded for parents (r = .86). For children, initiatory extra-logical behaviors were infrequently and only tenuously reliably coded (r = .65). The reverse frequency patterns occurred for reactive extra-logical processes. Since parents rarely engaged in these processes their reactive

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[1] Analysis of these individual categories from limited samples would have been statistically invalid. Furthermore, most if the categories involved, with the exception of giving orders which was analyzed separately, were not relevant for the questions that this study was concerned with.

extra-logical process moves were not reliably coded (r = .13). Since children were on the receiving end of parents' initiatory extra-logical moves, they generally responded with reactive extra-logical moves, and therefore, were reliably coded for these process moves. (r = .82).

Giving orders, a composite of requesting a performance and prohibiting a performance (PRF and PRO), was fairly frequently engaged in by parents and was quite reliably coded for them (r = .87). As was expected, children were rarely coded as engaging in giving orders and therefore only tenuous reliability (r = .62) could be established for this behavioral category. Compliance (CPL) and noncompliance (NCM) were important behavioral categories for this study and therefore their separate reliabilities were calculated. Compliance by parents was infrequent (see Table ?? 105 for frequencies), but tenuously reliably coded (r = .49). Although children were coded as complying more than their parents were, they often did so nonverbally, and therefore, children's complying was relatively infrequently coded and only tenuous reliability could be established (r = .64). Noncompliance by parents was rarely coded because parents tended to offer alternatives (ALT) or to restructure the interaction, rather than overtly refusing to comply. For parents, noncompliance could not be reliably measured (r = -.02). Children, when they do not comply, are generally quite overt in their actions and even though this was not a frequently coded behavior, it was highly reliable for coding purposes (r = .97).

APPENDIX G

Demographic and Developmental Testing Data

The second section contains demographic and developmental testing data and includes a report of the relationship of this data to both the block sorting task procedures and the block sorting task test (BST) scores.

An attempt was made to get an estimate of what the reliability of infrequently occurring categories would have been, if it had been possible to calculate inter-rater reliability using a larger amount of the data than had been sampled for the reliability study. The Spearman Brown prophecy formula was used to estimate the reliability that could be expected if 10 times more data had been utilized. (See tables 88 through 93 for the actual intraclass correlation coefficients obtained for the inter-rater reliability study samples, and for the estimated reliability coefficients using the Spearman Brown prophecy formula).

DEMOGRAPHIC DATA, TEST SCORES, AND TASK VARIABLES

Table 94 provides all of the mean scores used to analyze group differences and to determine the relationships between the demographic variables, developmental test scores, and the BST scores obtained by children from the three family groups. Results of the analyses of this data are described briefly. The correlations between certain of these demographic variables, test scores, and task variables are provided in Tables 11, 12, and 13 in chapter 4.

Table 9a

Means for Demographic Variables and Test Scores for Three Groups of Families

DEMOGRAPHIC VARIABLE	FAMILIES WITH NDB	NDG	DDB
Mothers' CA	32 yrs	31 yrs	30 yrs
Fathers' CA	34 yrs	33 yrs	32 yrs
Family Income Level[d]	3.25	2.63	2.00
Mothers' CHES Score	127.00	132.00[c]	113.00
Fathers' CHES Score	121.25	120.88	110.29
# of Days per Week in Preschool	3.13[b]	2.88[c]	4.86
# of Hours per Week in Preschool	3.63	3.00	4.57
# of Months Child has Attended Preschool	14.88	9.38	17.43

Children's CA (in months)	52[a]	47	51
TEST SCORES			
Children's MA (in months)	84[b]	72[c]	31
Children's AA (in months)	79[b]	77[c]	53
Children's (PAR) Social development Score	38.81[b]	38.06[c]	27.07
Children's BST Score with mothers	6.63[b]	6.38[c]	3.14
Children's BST Score with fathers	7.38[b]	5.63	4.14

Note. Post hoc comparisons of mean differences between groups were calculated using the Scheffe procedure (p >.05). NDB= Normally developing boys (n = 8). NDG= Normally developing girls, (n = 8). DDB= Developmentally delayed boys (n = 7). CA= Chronological age. MA= Mental age score obtained on the *Peabody Picture Vocabulary Test*. AA= Attainment age obtained on the *Preschool Attainment Record*. Social Development score= raw score total for items covering rapport, communication, and responsibility on the PAR. BST Score= score obtained on the block sorting task test.

[a]NDB significantly different from NDG.
[b]NDB significantly different from DDB.
[c]NDG significantly different from DDB.
[d]The four levels of income were: 1= $10,000 or less, 2= $11,000 to $20,000, 3= $21,000 to $40,000, 4= $41,000 and above.

Children's Chronological Age

The sample of children that were observed ranged in chronolocical ages (CA) from 42 months to 60 months. The mean age for the normally developing boys (NDB) was 51.88 months, for normally developing girls (NDG) the mean age was 46.63, and for developmentally delayed boys (DDB) the mean age was 51.14 months. A significant correlation (r = .507), between the NDC's CA and their sex (girl=1, boy=2), reflected the fact that the girls were indeed somewhat younger than the boys. However, a between groups analysis of variance for all three groups (N = 23) indicated that there was no significant difference in the age ranges of the three groups of children (F = 2.477, n.s.)[1]. A comparison of the results of analyses of variance for the discourse variables when they were covaried with CA, with results that were not covaried, provided further corroboration that CA differences were not sufficient to be considered as a significant source of systematic variance for the BSI scores obtained, nor for the proportion of pedagogical move types expressed by these children, or their parents.

These were no significant correlations between CA and *PPVT* mental age scores (MA) for any of the three groups of children. Correlations between CA and scores obtained on Task A or Task B were also nonsignificant for all three groups.

Children's Mental Age Scores

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[1] In addition a post hoc test of mean differences of CA, using the Scheffe procedure, indicated that there were no significant group differences in the mean CAs at the .05 probability level.

Mental age scores and BST scores for Task A or Task B were not significantly correlated for either of the NDC groups. However, for the DDB group, MA was significantly correlated with scores on Task A (r =.781, p <.02) , although it was not significantly correlated with scores on Task B (r =.463). It appears that for the normally developing children, with age appropriate receptive verbal language skills, factors other than variations in their verbal intelligence, as estimated by the PPVT, influenced their success on the classification tasks that were utilized. However, for the developmentally delayed boys an increase in their receptive language skills, reflected in their PPVT score, was associated with an increased ability to discriminate, and to group blocks by utilizing letters, as one of the relevant classification attributes in a block sorting task.

Sex/Role of Teaching Parent

For the overall sample of children N = 23), the block sorting task test scores obtained when mothers taught one of the tasks to their children (C/M BST scores) did not correlate significantly r =.59, p <.01) with the scores obtained when fathers taught the other task to their children (C/F BST scores).

When mothers were teaching their children, the correlation between the BST scores achieved by the normally developing children and the sex of those children (r =.071) was not significant. The mean task score for the NDB group when taught by their mothers was 6.63, the mean task score for the NDG group was 6.38, while the mean task score for the DDB group was 3.29. A post hoc comparison (Scheffe procedure, $p<.05$), of the differences between the mean scores for the three groups when mothers taught the task indicated that, although the mean scores for normally developing boys and girls did not differ significantly, the mean scores for both of these NDC groups were significantly different from the mean score of the DDB.

When fathers were teaching their NDC, the BST scores obtained by the children, and the sex of those children was significantly related (r =.495, $p<.05$). The mean score achieved by normally developing sons, taught by their fathers, was 7.38. Daughters, taught by their fathers, achieved a lower mean score of 5.63. When fathers taught their developmentally delayed sons, the mean task score obtained was 4.14. In examining these differences between mean BST scores for the three groups, when fathers were teaching, it was found that the scores achieved by the NDB and the DDB did differ significantly (Scheffe procedure, $p<.05$); however, the NDG's mean score, which fell between the scores for the two boy groups, was not significantly different from the mean scores for either of those two groups. This finding is attributed to the fact that, after they had been taught the task by their fathers, four girls (n =8) did not adequately verbally justify their block placements. Precisely why this occurred is not clear from the data collected for this study[1], but it certainly seems to be a question that could stand further investigation in future studies.

Although generally nonsignificant, the correlations between the BST scores of children when they were taught by their mothers or fathers, and those children's CAs and MAs, proved interesting. The correlation between the MAs for the NDB group and their C/M BST scores was quite high (r =.796, p =.009); however, their CAs and C/M BST scores were not significantly related (r =.405, n.s.). For girls who were developing normally the picture was quite different. There was virtually no relationship between the scores obtained with mothers and their daughter's MA scores (r =.02, n.s.); however, there was a significant negative relationship between the C/M BST scores and the CAs of these NDG (r =-.78, p <.02). (It must be noted that two of the younger girls received the highest MA scores for their group and that verbal and/or intellectual abilities, which were not tested, may have been more crucial variables than their

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[1] My impression was that these particular fathers were so charmed by their daughters, that they neglected to emphasize the need for verbal explanations of the block groupings.

parent, and the presentation order of the tasks had been counterbalanced, the sex of the NDC and the order in which the tasks were presented interacted, and were significantly related to the BST scores obtained by these children ($F = 5.76$, $p < .05$). These results reflect the fact that girls score less successfully ($M = 5.38$), when their first session involved performing Task B (matching shape and size attributes), and that they were more successful ($M = 6.63$), when their first session involved performing Task A (matching size and lettering attributes). For NDB the reverse was true; they performed more successfully ($M = 7.88$) when their first session involved performing Task B, but they performed less successfully ($M = 6.13$) when Task A was taught to them first[1]. Those DDB, whose first session involved Task B also obtained a higher mean BST score ($M = 4.7$), than these DDB whose first session involved Task A ($M = 2.9$). An ANCVA for the BST scores of DDB indicated that there were no significant main efects for task order, parent order, or parent sex/role. However, there was a significant three-way interaction effect for task order, parent order,

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[1] ANOVAS comparing just the two NDC groups revealed a significant three-way interaction between task order, parent order, and the normally developing children's PPVT MA scores ($F = 6.06$, $p = .034$). This statistical finding most likely reflects the fact that the two fathers who taught their daughters Task A first happened, on the basis of random assignment, to have daughters whose MA scores, while certainly in the normal range, were comparatively low (mean MA=55.5), and the two fathers who taught their sons Task B first happened to have sons with relatively high MAs (mean MA=101.5).

age.)

The scores obtained when mothers were teaching and the CAs and MAs of their developmentally delayed boys, although somewhat related, were not significantly correlated.

The CAs and MAs of children, when fathers were teaching the tasks, were not significantly related to the BST scores for any of the three groups of children.

Task A versus Task B

The task itself, (i.e., Task A versus Task B), had no significant main effect on the BST scores of the NDC (main effect for task A, F =.59, n.s.). Covariance for MA and CA did not alter this result.

For DDB this result differed, and an ANOVA for these children's BST scores revealed that they tended to score higher on Task B, which involved matching shape and height attributes, than a Task A, which involved matching height and letter attributes (main effect for task A, F =13.3, p <.05).

Task Presentation Order

Although the sex of the child, the sex/role of the and parent sex/role, (F = 13.3, p <.04), as well as a trend for a two-way interaction between task order and parent sex/role (F = 7.3, p <.08). In part these results reflect the fact that one of the two boys who were presented with Task A first by their mothers, refused to cooperate, and therefore obtained a C/M BST score of zero. (See Table 95 for individual scores).

Income Level

Income level was positively correlated with BST scores obtained when fathers taught their normally developing sons (r =.72, p >.05) and was negatively correlated to the number of toys father/NDB dyads used during the semi-structured free-play segment (r =-.71, p >.05). No significant correlations with income level were found for the BST scores obtained, or for the numbers of toys used when fathers and their NDG or DDB were interacting. Since the families of NDB not only had somewhat higher income levels, but also tended to be more highly educated it is not clear, given this small sample, whether the correlations indicate that more educated and economically successful fathers were more effective as teachers of the block-sorting task and more likely to engage their NDBs attention in a free-play situation (as measured by their use of less toys), or whether the combined higher educational attainment of both parents and/or the economic advantages of a higher income level was responsible for the significant correlations. In any case, income level did not correlate significantly with the mean BST scores obtained when mothers taught any of the groups of children nor with the number of toys any of the groups of mother/child dyads used while interacting during the semi-structured free-play segment.

Table 95 below provides the individual test scores obtained by each child. Parents CHES scores are also included.

Table 95

Task Scores, Test Scores, and Chronological Ages for Three Groups of Preschoolers

	BST Scores		Test Scores			CHES Scores	
Subjects	C/M	C/F	MA	AA	CA	mother	father
<u>Normally Developing Girls</u>							
1	8 (A-2)	4 (B-1)	94	82	44	150	128
2	6 (B-1)	4 (A-2)	62	76	48	130	119
3	6 (B-2)	3 (A-1)	53	72	42	136	122
4	6 (B-1)	8 (A-2)	73	80	49	136	136
5	6 (B-2)	8 (A-1)	58	80	52	138	125
6	8 (A-1)	8 (B-2)	94	78	42	142	121
7	8 (A-1)	6 (B-2)	53	75	43	115	119
8	3 (A-2)	4 (B-1)	90	78	53	105	97
NDG MEAN	6.38	5.63	72.13	77.63	46.63	132.00	120.88
SD	1.68	2.13	18.17	3.25	4.47	14.71	11.18

Normally Developing Boys

1	3 (B-2)	6 (A-1)	59	75	49	119	119
2	6 (B-2)	9 (A-1)	71	77	44	134	130
3	8 (A-2)	7 (B-1)	87	81	53	126	140
4	8 (B-1)	8 (A-2)	82	79	48	123	121
5	8 (A-1)	6 (B-2)	97	78	52	130	127
6	4 (A-1)	9 (B-2)	69	81	52	126	110
7	8 (A-2)	8 (B-1)	116	80	57	131	111
8	8 (B-1)	8 (A-2)	87	78	60	127	112
NDB MEAN	6.63	7.38	83.50	78.63	51.88	127.00	121.25
SD	2.07	.92	17.86	2.07	5.06	4.72	10.58

Developmentally Delayed Boys

1	4 (A-2)	4 (B-1)	43	57	49	107	114
2	4 (B-2)	4 (A-1)	39	53	52	98	92
3	3 (B-2)	2 (A-1)	25	59	52	123	121
4	2 (A-1)	4 (B-2)	24	61	43	107	102
5	4 (B-1)	3 (A-2)	26	46	60	102	94
6	0 (A-1)	4 (B-2)	25	35	47	134	135
7	5 (A-2)	8 (B-1)	37	75	56	120	114
DDB MEAN	3.14	4.14	31.29	52.57	51.14	113.00	110.29
SD	1.68	1.86	8.06	9.16	5.73	12.96	15.39

Note. BST scores=block sorting task test score. The task that was administered (A or B), and task order (1st or 2nd) are indicated in parentheses.

MA = Mental age scores on *Peabody Picture Vocabulary Test* (*in months*).

AA = attainment age score on *Preschool Attainment Record* (*in months*).

CA = Chronological ages (in months).

CHES = *Cognitive Home Environment Scale* scores for each parent.

APPENDIX H

Summaries of Relationships of Results And Hypotheses

Table 96

Results for Pedagogical Move Types

Prediction	Hypothesis	Comparison	Result
# of moves by dyads	Ho1	Family Group	P/DDB>P/NDG>P/NDB**
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP>SBST***
	Ho7	Interactions	None
% of moves by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Mothers>Fathers*
	Ho3	Activity	SSFP<SBST**
	Ho7	Interactions	None
# of Words per move by P	Ho1	Family Group	P/NDB>P/NDG>P/DDB***
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP<SBST*
	Ho7	Interactions	None
% of soliciting moves by P	Ho1	Family Group	P/DDB>P/NDG>P/NDB**
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	Not rejected
	Ho7	Interactions	None
% of tag questions by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP<SBST*
	Ho7	Interactions	ParsexXFmgrpXActvy*
% of responding moves by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP>SBST*
	Ho7	Interactions	None
% of nonverbal moves by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP>SBST**
	Ho7	Interactions	None

% of not clear	Ho1	Family Group	Not rejected
moves by P	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	Not rejected
	Ho7	Interactions	None
% of initiatory	Ho1	Family Group	Not rejected
moves by P	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP<SBST**
	Ho7	Interactions	None
% of reactive	Ho1	Family Group	Not rejected
moves by P	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP>SBST**
	Ho7	Interactions	None
% of parents'	Ho1	Family Group	Not rejected
answers to	Ho2	Parent Sex/Role	Not rejected
children's solici-	Ho3	Activity	Not rejected
tations (ANSWER)	Ho7	Interactions	None
% of parents'	Ho1	Family Group	Not rejected
moves that are	Ho2	Parent Sex/Role	Not rejected
solicitations	Ho3	Activity	SSFP>SBST***
about substantive	Ho7	Interactions	None
content (ASKSBS)			
% of parents'	Ho1	Family Group	Not rejected
moves that are	Ho2	Parent Sex/Role	Fathers>Mothers**
solicitations about	Ho3	Activity	SSFP<SBST***
instructional	Ho7	Interactions	None
content (ASKINS)			
% of parents'	Ho1	Family Group	Not rejected
soliciting moves	Ho2	Parent Sex/Role	Not rejected
that are subst-	Ho3	Activity	SSFP<SBST***
antively oriented	Ho7	Interactions	None
(SUBSOL)			
% of parent's	Ho1	Family Group	P/NDG=P/NDB>P/DDB**
soliciting moves	Ho2	Parent Sex/Role	Not rejected
that are instruct-	Ho3	Activity	SSFP>SBST***
ionally oriented		Interactions	None
(INSSOL)			
% of moves by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	C/M<C/F**
	Ho10	Activity	SSFP>SBST**
	Ho14	Interactions	None
# of words per	Ho8	Family Group	NDG>NDB>DDB***
move by C	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP>SBST**
	Ho14	Interactions	Famgrp X Activity*
% of soliciting	Ho8	Family Group	Not rejected

moves by C	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP>SBST*
	Ho14	Interactions	Parsex X Activity*
% of responding moves by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST*
	Ho14	Interactions	None
% of nonverbal moves by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST***
	Ho14	Interactions	None
% of not clear moves by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP>SBST*
	Ho14	Interactions	Famgrp X Parsex*
% of initiatory moves by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP>SBST**
	Ho14	Interactions	Parsex X Activity**
% of reactive moves by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST**
	Ho14	Interactions	Parsex X Activity**
% of children's answers to parents' solicitations (ANSWER)	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	Not rejected
% of children' moves that are solicitations about substantive content (ASKSBS)	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	None
% of children's moves that are solicitations about instructional content (ASKIMS)	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	None
% of children's soliciting moves that are substantively oriented (SUBSOL)	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	C/M>C/F*
	Ho10	Activity	Not rejected
	Ho14	Interactions	None
% of children's	Ho8	Family Group	Not rejected

soliciting moves that are instructionally oriented (INSSOL)	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	FmgrpXParsexXActvy*

Note. All hypotheses were tested by 3X2X2 ANOVAS with repeated measures for Parent Sex/Role and Activity. Alpha was set at < .05.

* p < .05. ** p < .01. *** p < .001.

Table 97

Results for References to Substantive Meanings

Prediction	Hypothesis	Comparison	Result
There will be no significant differences in the mean:			
% of references to Substantive content by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Mothers>Fathers*
	Ho3	Activity	SSFP<SBST***
	Ho7	Interactions	Famgrp X Activity*
% of references to state-object relationships by P	Ho1	Family Group	P/NDG=P/NDB<P/DDB**
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP>SBST**
	Ho7	Interactions	Famgrp X Activty***
% of references to spatial relationships by P	Ho1	Family Group	P/DDB>P/NDB>P/NDG**
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	Not rejected
	Ho7	Interactions	Famgrp X Activity**
% of references to operational knowledge by P	Ho1	Family Group	P/NDG>P/NDB=P/DDB*
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP<SBST
	Ho7	Interactions	Famgrp X Activity*
% of references to classification by P	Ho1	Family Group	P/NDG>P/NDB>P/DDB**
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP<SBST***
	Ho7	Interactions	Famgrp X Activity**
% of references to representation by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP>SBST*
	Ho7	Interactions	None
% of references to numerical rela-	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected

Prediction	Hypothesis	Comparison	Result
There will be no differences in the mean:			
% of explaining substantive content by P	Ho1	Family Group	P/NDB>P/NDG>P/DDB**
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP<SBST**
	Ho7	Interactions	None
% of substantive-logical moves by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST***
	Ho14	Interactions	None
% of analytical moves by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	None
% of empirical moves by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST***
	Ho14	Interactions	None
% of fact-stating about substantive content by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	None
% of providing and/or requesting substantive information by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST**
	Ho14	Interactions	None

Note. All hypotheses were tested by 3X2X2 ANOVAS with repeated measures for Parent Sex/Role and Activity. Alpha was set at .05.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 99

Results for References to Instructional Meanings

Prediction	Hypothesis	Comparison	Result
There will be no significant differences in the mean:			
% of references to	Ho1	Family Group	Not rejected

tionships by P	Ho3	Activity	Not rejected
	Ho7	Interactions	None
% of references to substantive content by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST***
	Ho14	Interactions	None
% of references to achievement by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	None
% of references to object attributes by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	None
% of references to state-object relationships by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP>SBST*
	Ho14	Interactions	Famgrp X Activity*
% of references to spatial relationships by C	Ho8	Family Group	DDB>NDB>NDG*
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	Famgrp X Activity*
% of references to operational knowledge by C	Ho8	Family Group	NDG>NDB>DDB**
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST***
	Ho14	Interactions	Famgrp X Activity*
% of references to classification by C	Ho8	Family Group	NDG>NDB>DDB***
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST***
	Ho14	Interactions	Famgrp X Activty***
% of references to representation by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	None

<u>Note</u>. All hypotheses were tested by 3X2X2 ANOVAS with repeated measures for Parent Sex/Role and Activity. Alpha was set at .05.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 98

Results for Substantive-Logical Meanings

instructional content by P	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP>SBST***
	Ho4	Interactions	None
% of references to statements by P	Ho1	Family Group	P/NDG>P/NDB>P/DDB***
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	Not rejected
	Ho7	Interactions	Famgrp X Activity*
% of repeated statements by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP>SBST*
	Ho7	Interactions	None
% of expanded statements by P	Ho1	Family Group	P/DDB>P/NDB>P/NDG*
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP>SBST**
	Ho7	Interactions	None
% of altered statements by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	Not rejected
	Ho7	Interactions	None
% of references to action and/or procedures by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	Not rejected
	Ho7	Interactions	Famgrp X Activity*
% of references to cognitive actions by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	Not rejected
	Ho7	Interactions	None
% of references to instructional content by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP>SBST*
	Ho14	Interactions	None
% of references to action and/or procedures by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	Famgrp X Activity*
% of repeated statements by C	Ho8	Family Group	DDB>NDG=NDB***
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	None
% of references to persons by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	C/M>C/F*
	Ho10	Activity	SSFP>SBST*
	Ho14	Interactions	None

Note. All hypotheses were tested by 3X2X2 ANOVAS with repeated measures for Parent Sex/Role and Activity. Alpha was set at .05.
* $p < .05$. * $p < .01$. *** $p < .001$.

Table 100

Results for Instructional-Logical Meanings

Prediction	Hypothesis	Comparison	Result
There will be no significant differences in the mean:			
% of evaluatory process moves by P	Ho1	Family Group	P/NDG>P/NDB>P/DDB**
	Ho2	Parent Sex/Role	Mothers<Fathers*
	Ho3	Activity	Not rejected
	Ho7	Interactions	None
% of opining moves by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Mothers<Fathers*
	Ho3	Activity	SSFP>SBST***
	Ho7	Interactions	None
% of rating moves by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP<SBST*
	Ho7	Interactions	None
% of positive ratings by P	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	Not rejected
	Ho7	Interactions	None
% of positive rating moves with substantive-logical meaning by P (POSPLS)	Ho1	Family Group	P/NDG=P/NDB>P/DDB*
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP<SBST*
	Ho7	Interactions	None
% of negative ratings by P	Ho1	Family Group	P/DDB>P/NDG>P/NDB*
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP<SBST*
	Ho7	Interactions	None
% of negative ratings moves with substantive-logical meaning by P (NEGPLS)	Ho1	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	Not rejected
	Ho7	Interactions	None
% of ratings by	Ho1	Family Group	P/NDB>P/NDG>P/DDB*

p that are positive ratings (RATEPOS)	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	Not rejected
	Ho7	Interactions	None
% of ratings by P that are negative ratings (RATENEG)	Ho1	Family Group	P/DDB>P/NDG>P/NDB*
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	Not rejected
	Ho7	Interactions	None
% of empirical process moves by C	Ho8	Family Group	NDB>NDG>DDB*
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP>SBST***
	Ho14	Interactions	Famgrp X Activty**
% of evaluatory process moves by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	C/M<C/F**
	Ho10	Activity	Not rejected
	Ho14	Interactions	None
% of opining moves by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	C/M<C/F*
	Ho10	Activity	Not rejected
	Ho14	Interactions	None
% of rating moves by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	None
% of positive ratings by C	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	C/M<C/F*
	Ho10	Activity	Not rejected
	Ho14	Interactions	Famgrp X Activity*
% of positive ratings moves with substantive-logical meaning by C (POSPLS)	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	None
% of C moves involving providing or requesting information (INFO)	Ho8	Family Group	NDB>NDG>DDB*
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	Not rejected
	Ho14	Interactions	None

Note. All hypotheses were tested by 3X2X2 ANOVAS with repeated measures for Parent Sex/Role and Activity. Alpha was set at .05.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 101

Results for Extra-Logical Meanings

Prediction	Hypothesis	Comparison	Result
There will be no significant differences in the mean:			
% of extra-logical process moves by P	Ho1	Family Group	P/DDB>P/NDG>P/NDB***
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	Not rejected
	Ho7	Interactions	Famgrp X Activity*
% of initiatory extra-logical moves by P	Ho1	Family Group	P/DDB>P/NDG>P/NDB***
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP<SBST**
	Ho7	Interactions	None
% of orders by P	Ho1	Family Group	P/DDB>P/NDG>P/NDB***
	Ho2	Parent Sex/Role	Not rejected
	Ho3	Activity	SSFP<SBST***
	Ho7	Interactions	None
% of extra-logical process moves by C	Ho8	Family Group	DDB>NDG=NDB*
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST**
	Ho14	Interactions	None
% of reactive extra-logical moves by C	Ho8	Family Group	DDB>NDG=NDB**
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST***
	Ho14	Interactions	None
% of noncompliance moves by C	Ho8	Family Group	DDB>NDG>NDB*
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST*
	Ho14	Interactions	Famgrp X Activity*
ratio of compliance moves by C to orders moves by P (COOP)	Ho8	Family Group	Not rejected
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST*
	Ho14	Interactions	Famgrp X Activity**
ratio of noncompliance moves by C to Orders moves by P (NO COOP)	Ho8	Family Group	DDB>NDG>NDB*
	Ho9	Parent Sex/Role	Not rejected
	Ho10	Activity	SSFP<SBST*
	Ho14	Interactions	Famgrp X Activity*

Note. All hypotheses were tested by 3X2X2 ANOVAS with repeated measures for Parent Sex/Role and Activity. Alpha was set at .05.

* p ≤.05. ** p ≤.01. *** p ≤.001.

Table 102

Results for Parent/Child Dyadic Educational

Transactions (ETs)

Prediction	Hypothesis	Comparison	Result
There will be no significant differences in the mean:			
Number of ETs per dyad	Ho4	Family Group	P/DDB>P/NDG>P/NDB**
	Ho5	Parent Sex/Role	Not rejected
	Ho6	Activity	SSFP>SBST***
	Ho7	Interactions	None
% of ETs parents particapate in	Ho4	Family Group	Not rejected
	Ho5	Parent Sex/Role	Not rejected
	Ho6	Activity	Not rejected
	Ho7	Interactions	None
% of ETs children participate in	Ho11	Family Group	Not rejected
	Ho12	Parent Sex/Role	C/F>C/M*
	Ho13	Activity	Not rejected
	Ho14	Interactions	Famgrp X Parsex*
# of word per ET for dyads	Ho4	Family Group	P/NDB>P/NDG>P/DDB***
	Ho5	Parent Sex/Role	Not rejected
	Ho6	Activity	Not rejected
	Ho7	Interactions	None
% of Parent Initiated ETs	Ho4	Family Group	Not rejected
	Ho5	Parent Sex/Role	Not rejected
	Ho6	Activity	SSFP<SBST*
	Ho7	Interactions	None
% of Child Initiated ETs	Ho11	Family Group	Not rejected
	Ho12	Parent Sex/Role	Not rejected
	Ho13	Activity	SSFP>SBST*
	Ho14	Interactions	None
% of Parent Input ETs	Ho4	Family Group	Not rejected
	Ho5	Parent Sex/Role	Mothers>Fathers*
	Ho6	Activity	Not rejected
	Ho7	Interactions	Famgrp X Parsex*
% of Child Input ETs	Ho11	Family Group	Not rejected
	Ho12	Parent Sex/Role	Not rejected
	Ho13	Activity	Not rejected
	Ho14	Interactions	None

% of Dyadic ETs	Ho4	Family Group	Not rejected
	Ho5	Parent Sex/Role	Not rejected
	Ho6	Activity	Not rejected
	Ho7	Interactions	Famgrp X Parsex*
% of Brief ETs(2-3 moves)	Ho4	Family Group	Not rejected
	Ho5	Parent Sex/Role	Mothers<Fathers*
	Ho6	Activity	Not rejected
	Ho7	Interactions	None
% of Moderate ETs(4-7 moves)	Ho4	Family Group	Not rejected
	Ho2	Parent Sex/Role	Not rejected
	Ho6	Activity	Not rejected
	Ho7	Interactions	Parsex X Activity*
% of Sustained ETs(8 or more moves)	Ho4	Family Group	Not rejected
	Ho5	Parent Sex/Role	Not rejected
		Activity	Not rejected
	Ho7	Interactions	None
% of Substantive Content ETs	Ho4	Family Group	Not rejected
	Ho5	Parent Sex/Role	Not rejected
	Ho6	Activity	SSFP<SBST***
	Ho7	Interactions	None
% of Instructional Content ETs	Ho	Family Group	Not rejected
	Ho	Parent SexRole	Not rejected
	Ho	Activity	SSFP>SBST***
	Ho	Interactions	None
% of Combined Subst./Instr. Content ETs	Ho	Family Group	Not rejected
	Ho	Parent Sex/Role	Not rejected
	Ho	Activity	Not rejected
	Ho	Interactions	None
% of Not Predominant content ETs	Ho	Family Group	Not rejected
	Ho	Parent Sex/Role	Not rejected
	Ho	Activity	Not rejected
	Ho	Interactions	None
% of Not Clear ETs	Ho	Family Group	P/DDB>P/NDG>/P/NDb***
	Ho	Parent Sex/Role	Not rejected
	Ho	Activity	Not rejected
	Ho	Interactions	None

Note. All hypotheses were tested by a 3X2X2 ANOVA with repeated measures for Parent Sex/Role and Activity. Alpha was set at .05.

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Table 103

Results for Educational Transactions Parents

Participated In

Prediction	Hypothesis	Comparison	Result
There will be no significant differences in the mean:			
# of Words per ET by parent	Ho4	Family Group	P/NDB>P/NDG>P/DDB***
	Ho5	Parent Sex/Role	Mothers>Fathers*
	Ho6	Activity	SSFP<SBST***
	Ho7	Interactions	None
% of Input ETs	Ho4	Family Group	Not rejected
	Ho5	Parent Sex/Role	Not rejected
	Ho6	Activity	Not rejected
	Ho7	Interactions	Famgrp X Parsex*
% of Substantive Content ETs	Ho4	Family Group	Not rejected
	Ho5	Parent Sex/Role	Not rejected
	Ho6	Activity	SSFP<SBST***
	Ho7	Interactions	None
% of Instructional Content ETs	Ho4	Family Group	Not rejected
	Ho5	Parent Sex/Role	Mothers<Fathers*
	Ho6	Activity	SSFP>SBST***
	Ho7	Interactions	None
% of Combined Content ETs	Ho4	Family Group	Not rejected
	Ho5	Parent Sex/Role	Not rejected
	Ho6	Activity	Not rejected
	Ho7	Interactions	None
% of No Predominant Content ETs	Ho4	Family Group	P/NDB>P/NDG>P/DDB*
	Ho5	Parent Sex/Role	Mothers>Fathers*
	Ho6	Activity	SSFP<SBST**
	Ho7	Interactions	Famgrp X Activity*
% of Not Clear ETs	Ho4	Family Group	Not rejected
	Ho5	Parent Sex/Role	Not rejected
	Ho6	Activity	Not rejected
	Ho7	Interactions	Not rejected

Note. All hypotheses were tested by a 3X2X2 ANOVA with repeated measures for Parent Sex/Role and Activity. Alpha was set at .05.

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Table 104

Results for Educational Transactions Children

Participated In

Prediction	Hypothesis	Comparison	Result
There will be no significant differences in the mean:			
# of Words per ET by Child	Ho11	Family Group	NDG>NDB>DDB***
	Ho12	Parent Sex/Role	Not rejected
	Ho13	Activity	SSFP>SBST***
	Ho14	Interactions	None
% of Input ETs	Ho11	Family Group	Not rejected
	Ho12	Parent Sex/Role	Not rejected
	Ho13	Activity	Not rejected
	Ho14	Interactions	None
% of Substantive ETs	Ho11	Family Group	Not rejected
	Ho12	Parent Sex/Role	Not rejected
	Ho13	Activity	SSFP<SBST*
	Ho14	Interactions	None
% of Instructional ETs	Ho11	Family Group	Not rejected
	Ho12	Parent Sex/Role	Not rejected
	Ho13	Activity	SSFP>SBST***
	Ho14	Interactions	None
% of Combined Content ETs	Ho11	Family Group	Not rejected
	Ho12	Parent Sex/Role	Not rejected
	Ho13	Activity	Not rejected
	Ho14	Interactions	None
% of No Predominant Content ETs	Ho11	Family Group	Not rejected
	Ho12	Parent Sex/Role	Not rejected
	Ho13	Activity	Not rejected
	Ho14	Interactions	None
% of Not Clear ETs	Ho11	Family Group	Not rejected
	Ho12	Parent Sex/Role	Not rejected
	Ho13	Activity	Not rejected
	Ho14	Interactions	None

Note. All hypotheses were tested by a 3X2X2 ANOVA with repeated measures for Parent Sex/Role and Activity. Alpha was set at .05.

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$.

Table 105

Relationships for Pedagogical Move Types

Prediction	Hypothesis	Result
There will be no significant relationship between C/M BSI scores and:		
% of moves by		
M during M/C SSFP	Ho15	negative r*
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	positive r*
C during M/C SBST	Ho19	not rejected
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
% of Initiatory Moves by		
M during M/C SSFP	Ho15	negative r***
M during M/C SBST	Ho15	negative r*
C during M/C SSFP	Ho19	positive r**
C during M/C SBST	Ho19	not rejected
F during F/C SSFP	Ho17	negative r*
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
Mean # of Words per Move by		
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	positive r**
C during M/C SBST	Ho19	positive r**
F during F/C SSFP	Ho17	positive r**
F during F/C SBST	Ho17	positive r**
C during F/C SSFP	Ho21	positive r**
C during F/C SBST	Ho21	positive r*
% of Nonverbal Moves by		
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	negative r*
C during M/C SBST	Ho19	not rejected[a]
F during F/C SSFP	Ho17	not rejected

F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
% of Answering Moves by		
M during M/C SSFP	Ho15	Positive *r***
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	negative *r**
There will be no significant relationship between C/F BSI scores and:		
% of moves by		
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected
% of Initiatory Moves by		
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
M during M/C SSFP	Ho15	negative *r**
M during M/C SBST	Ho15	not rejected[a]
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected
Mean # of Words per Move by		
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected

Prediction	Hypothesis	Result
% of Nonverbal Moves by		
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected
% of Answering Moves by		
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
M during M/C SSFP	Ho15	positive r**
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected

Note. All hypotheses were tested by using Pearson product moment correlations. Alpha was set at .05. C/M BST scores = scores obtained after mothers taught (n =23). C/F BST scores = scores obtained after fathers taught (n =23). M = mothers. F = fathers. C = children. SSFP = semi-structured free-play activity. SBST = structured block sorting task activity.

[a]Trend for negative r (r =-.41; p $\leq$ .05 if r =-.42).

* $p<.05$. ** $p<.01$. *** $p<.001$.

Table 106

Relationships for Content References

Prediction	Hypothesis	Result
There will be no significant relationship between C/M BST scores and:		
% of substantive content moves by		
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	positive r*
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	positive r**
F during F/C SSFP	Ho17	negative r*

F during F/C SBST	Ho17	negative r*
C during F/C SSFP	ho21	not rejected
C during F/C SBST	Ho21	not rejected

% Instructional content moves by

M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	negative r*
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	negative r*
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	positive r*
C during F/C SBST	Ho21	not rejected

% of cognitive action moves

M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	positive r*
C during F/C SBST	Ho21	not rejected

There will be no significant relationship between C/F BST and:

% of substantive content moves by

F during F/C SSFP	Ho17	negative r*
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected

% instructional content moves by

F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during F/C SBST	Ho19	not rejected

% of cognitive action moves		
F during F/C SSFP	Ho17	positive r*
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	positive r**
C during F/C SBST	Ho21	not rejected
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	positive**
C during M/C SBST	Ho19	not rejected

Note. All hypotheses were tested by using Pearson product moment correlations. Alpha was set at .05. C/M BST scores = scores obtained after mothers taught (n =23). C/F scores = scores obtained after fathers taught (n =23). M = mothers. F = fathers. C = children. SSFP = semi-structured free-play activity. SBST = structured block sorting task activity.

* $p<.05$. ** $p<.01$. *** $p<.001$.

Table 107

Relationships for Communicative Functions of

Verbal-Logical Moves

Prediction	Hypothesis	Result
There will be no significant relationship between C/M BST scores and:		
% of substantive-logical moves by		
M during M/C SSFP[t]	Ho15	not rejected
M during M/C SBST[t]	Ho15	positive r*
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	positive r**
F during F/C SSFP[t]	Ho17	not rejected
F during F/C SBST[t]	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
% of explaining substantive content[a] by		
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	positive r*
F during F/C SSFP	Ho17	not rejected[b]
F during F/C SBST	Ho17	not rejected

% of providing or requesting substantive information by

M during M/C SSFP[t]	Ho15	not rejected
M during M/C SBST[t]	Ho15	positive**
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	positive*
F during F/C SSFP[t]	Ho17	not rejected
F during F/C SBST[t]	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected

% of instructional-logical moves by

M during M/C SSFP[t]	Ho15	positive r*
M during M/C SBST[t]	Ho15	not rejected
C during M/C SSFP[t]	Ho19	positive r*
C during M/C SBST[t]	Ho19	not rejected
F during F/C SSFP[t]	Ho17	not rejected
F during F/C SBST[t]	Ho17	positive r**
C during F/C SSFP[t]	Ho21	positive r*
C during F/C SBST[t]	Ho21	not rejected

% of rating moves by

M during M/C SSFP	Ho15	positive r**
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected

% of positive rating moves by

M during M/C SSFP	Ho15	positive r***
M during M/C SBST	Ho17	positive r*
F during F/C SSFP	Ho17	positive r*
F during F/C SBST	Ho17	not rejected

% of negative rating moves by

M during M/C SSFP	Ho15	negative r**
M during M/C SBST	Ho15	negative r*
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected

% of positive ratings with substantive content feedback by

M during M/C SSFP	Ho15	positive r**
M during M/C SBST	Ho15	positive r*
C during M/C SSFP	Ho19	not rejected

C during M/C SBST	Ho19	not rejected
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected

% of negative ratings with substantive content feedback by

M during M/C SSFP	Ho15	negative r*
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected

There will be no significant relationship
between C/F BST scores and:

% of substantive-logical moves by

F during F/C SSFP[t]	Ho17	not rejected
F during F/C SBST[t]	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
M during M/C SSFP[t]	Ho15	not rejected
M during M/C SBST[t]	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected

% of explaining substantive content[a] by

F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	not rejected

% of providing or requesting substantive information by

F during F/C SSFP[t]	Ho17	not rejected
F during F/C SBST[t]	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
M during M/C SSFP[t]	Ho15	not rejected
M during M/C SBST[t]	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected

% of instructional-logical moves by

F during F/C SSFP[t]	Ho17	positive r*
F during F/C SBST[t]	Ho17	not rejected
C during F/C SSFP[t]	Ho21	not rejected
C during F/C SBST[t]	Ho21	not rejected
M during M/C SSFP[t]	Ho15	not rejected
M during M/C SBST[t]	Ho15	positive r*
C during M/C SSFP[t]	Ho19	not rejected
C during M/C SBST[t]	Ho19	not rejected

% of rating moves by

F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	positive*
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected

% of positive rating moves by

F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected[c]
M during M/C SSFP	Ho15	not rejected
M during M/C SBST	Ho15	positive**

% of negative rating moves by

F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
M during M/C SSFP	Ho15	negative r*
M during M/C SBST	Ho15	not rejected

% of positive ratings with substantive content feedback by

F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
M during M/C SSFP	Ho15	positive r*
M during M/C SBST	Ho15	positive r**
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected

% of negative ratings with substantive content feedback by

F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	not rejected
C during F/C SSFP	Ho21	not rejected

C during F/C SBST	Ho21	not rejected
M during M/C SSFP	Ho15	negative r*
M during M/C SBST	Ho15	not rejected
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected

Note. All hypotheses were tested by using Pearson product moment correlations. Alpha was set at .05. C/M BST scores = scores obtained after mothers taught (n =23). C/F BST scores = scores obtained after fathers taught (n =23). M = mothers. F = fathers. C = children. SSFP = semi-structured free-play activity. SBST = structured block sorting task activity.

[a]Coding Category only coded reliably for parents.
[b]Trend for positive r ($r = -.41$: $p \le .05$ if $r = -.42$).
[c]Trend for positive r ($r = .40$: $p \le .05$ if $r = .42$).
[t]Coding category tenuously reliable.
* $p<.05$. ** $p<.01$. *** $p<.001$.

Table 108

Relationships for Communicative Functions of

Extra-Logical Moves

Prediction	Hypothesis	Result
There will be no significant relationship between C/M BSI scores and:		
% of extra-logical moves by		
M during M/C SSFP	Ho15	negative r**
M during M/C SBST	Ho15	negative r***
C during M/C SSFP	Ho19	negative r*
C during M/C SBST	Ho19	negative r**
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	negative r**
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
% of orders moves by[a]		
M during M/C SSFP	Ho15	negative r***
M during M/C SBST	Ho15	negative r***
F during F/C SSFP	Ho17	not rejected
F during F/C SBST	Ho17	negative r*
% of noncompliance by[b]		

C during M/C SSFP	Ho19	negative r**
C during M/C SBST	Ho19	negative r**
C during F/C SSFP	Ho21	negative r**
C during F/C SBST	Ho21	not rejected
There will be no relationship between C/F BST scores and:		
% of extra-logical moves by		
F during F/C SSFP	Ho17	negative r*
F during F/C SBST	Ho17	negative r*
C during F/C SSFP	Ho21	not rejected
C during F/C SBST	Ho21	not rejected
M during M/C SSFP	Ho15	negative r*
M during M/C SBST	Ho15	negative r**
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected
% of orders moves by[a]		
F during F/C SSFP	Ho17	not rejected[c]
F during F/C SBST	Ho17	negative r*
M during M/C SSFP	Ho15	negative r**
M during M/C SBST	Ho15	negative r**
% of noncompliance moves by[b]		
C during F/C SSFP	Ho21	not rejected[d]
C during F/C SBST	Ho21	negative r*
C during M/C SSFP	Ho19	not rejected
C during M/C SBST	Ho19	not rejected[c]

Note. All hypotheses were tested by using Pearson product moment correlations. Alpha was set at .05. C/M BST scores = scores obtained after mothers taught (n =23). C/F BST scores = scores obtained after fathers taught (n =23). M = mothers. F = fathers. C = children. SSFP = semi-structured free-play activity. SBST = structured block sorting task activity.

[a]Orders moves by children occurred too infrequently to analyze

[b]Noncompliance moves by parents occurred too infrequently to analyze.

[c]Trend for negative r (r =-.40; p <.05 if r = .42).

[d]Trend for negative r (r =-.39).

* p<.05. ** p<.01. *** p<.001.

Table 109

Relationships for Duration and Interactive Qualities of Educational Transactions

Prediction	Hypothesis	Result
There will be no significant relationship between C/M BST scores and:		
Mean # of words per ET by		
M/C during M/C SSFP	Ho16	not rejected
M/C during M/C SBST	Ho16	not rejected
F/C during F/C SSFP	Ho18	positive r*
F/C during F/C SBST	Ho18	positive r*
% of ETs participated in by		
M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	positive r**
C during M/C SBST	Ho20	not rejected
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
% of ET initiated by		
M during M/C SSFP	Ho16	negative r*
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	positive r*
C during M/C SBST	Ho20	not rejected
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
% of ETs initiated with soliciting moves by		
M during M/C SSFP	Ho16	negative r***
M during M/C SBST	Ho16	negative r*
C during M/C SSFP	Ho20	positive r*
C during M/C SBST	Ho20	not rejected
F during F/C SSFP	Ho18	negative r**
F during F/C SBST	Ho18	negative r*
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected

% of ETs initiated with responding moves by

M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	negative r*
C during M/C SBST	Ho20	not rejected
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected

% of input ETs by

M during M/C SSFP	Ho16	negative r**
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	not rejected
C during M/C SBST	Ho20	not rejected
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected

% of dyadic ETs by

M/C during M/C SSFP	Ho16	positive r**
M/C during M/C SBST	Ho16	not rejected
F/C during F/C SSFP	Ho18	not rejected
F/C during F/C SBST	Ho18	not rejected

% of brief ETs by

M/C during M/C SSFP	Ho16	positive r**
M/C during M/C SBST	Ho16	not rejected
F/C during F/C SSFP	Ho18	not rejected
F/C during F/C SBST	Ho18	not rejected

% of moderate ETs by

M/C during M/C SSFP	Ho16	not rejected
M/C during M/C SBST	Ho16	not rejected
F/C during F/C SSFP	Ho18	not rejected
F/C during F/C SBST	Ho18	not rejected

% of sustained ETs by

M/C during M/C SSFP	Ho16	not rejected
M/C during M/C SBST	Ho16	not rejected
F/C during F/C SSFP	Ho18	not rejected
F/C during F/C SBST	Ho18	not rejected

There will be no relationship
between C/F BSI scores and:

Mean # of words per ET by		
F/C during F/C SSFP	Ho18	positive r*
F/C during F/C SBSI	Ho18	not rejected
M/C during M/C SSFP	Ho16	positive r*[a]
M/C during M/C SBSI	Ho16	not rejected
% of ETs participated in by		
F during F/C SSFP	Ho18	not rejected
F during F/C SBSI	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBSI	Ho22	not rejected
M during M/C SSFP	Ho16	not rejected
M during M/C SBSI	Ho16	positive r*
C during M/C SSFP	Ho20	not rejected
C during M/C SBSI	Ho20	not rejected
% of ETs initiated by		
F during F/C SSFP	Ho18	not rejected
F during F/C SBSI	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
M during M/C SSFP	Ho16	not rejected
M during M/C SBSI	Ho16	not rejected
C during M/C SSFP	Ho20	not rejected
C during M/C SBST	Ho20	not rejected
% of ETs initiated with soliciting moves by		
F during F/C SSFP	Ho18	not rejected
F during F/C SBSI	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
M during M/C SSFP	Ho16	negative r*
M during M/C SBSI	Ho16	not rejected
C during M/C SSFP	Ho20	not rejected
C during M/C SBSI	Ho20	not rejected
% of ETs initiated with responding moves by		
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
M during M/C SSFP	Ho16	not rejected

M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	not rejected
C during M/C SBST	Ho20	not rejected
% of input ETs by		
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	not rejected
C during M/C SBST	Ho20	negative r*
% of dyadic ETs by		
F/C during F/C SSFP	Ho18	not rejected
F/C during F/C SBST	Ho18	not rejected
M/C during M/C SSFP	Ho16	not rejected
M/C during M/C SBST	Ho16	positive*
% of brief ETs by		
F/C during F/C SSFP	Ho18	not rejected
F/C during F/C SBST	Ho18	not rejected
M/C during M/C SSFP	Ho16	not rejected
M/C during M/C SBST	Ho16	not rejected
% of moderate ETs by		
F/C during F/C SSFP	Ho18	not rejected
F/C during F/C SBST	Ho18	not rejected
M/C during M/C SSFP	Ho16	not rejected
M/C during M/C SBST	Ho16	positive r*
% of sustained ETs by		
F/C during F/C SSFP	Ho18	not rejected
F/C during F/C SBST	Ho18	not rejected
M/C during M/C SSFP	Ho16	not rejected
M/C during M/C SBST	Ho16	not rejected

Note. All hypotheses were tested by using Pearson product moment correlations. Alpha was set at .05. C/M BST scores = scores obtained after mothers taught (n =23). C/F BST scores = scores obtained after fathers taught (n =23). M = mothers. F = fathers. C = children. SSFP = semi-structured free-play activity. SBST = structured block sorting task activity.

[a]Trend for positive r (r =-.40; p <.05 if r = $\geq$ .42).

* p<.05. ** p<.01. *** p<.001.

Table 110

Relationships for Content Orientations of

Educational Transactions

Prediction	Hypothesis	Result
There will be no significant relationship between C/M BSI scores and:		
% of substantive content ETs by		
M/C dyads during SSFP	Ho16	not rejected
M/C dyads during SBST	Ho16	not rejected
M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	not rejected
C during M/C SBST	Ho20	positive r**
F/C dyads during SSFP	Ho18	not rejected
F/C dyads during SBST	Ho18	positive r*
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
% of instructional content ETs by		
M/C dyads during SSFP	Ho16	not rejected
M/C dyads during SBST	Ho16	negative r*
M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	negative r*
C during M/C SSFP	Ho20	not rejected[a]
C during M/C SBST	Ho20	not rejected
F/C dyads during SSFP	Ho18	not rejected
F/C dyads during SBST	Ho18	not rejected
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
% of combined content ETs by		

M/C dyads during SSFP	Ho16	not rejected
M/C dyads during SBST	Ho16	not rejected
M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	positive***
C during M/C SBST	Ho20	not rejected
F/C dyads during SSFP	Ho18	not rejected
F/C dyads during SBST	Ho18	not rejected
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	negative r*

% of no predominant content ETs by

M/C dyads during SSFP	Ho16	not rejected
M/C dyads during SBST	Ho16	positive r**
M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	not rejected
C during M/C SBST	Ho20	not rejected
F/C dyads during SSFP	Ho18	not rejected
F/C dyads during SBST	Ho18	not rejected
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected

% of unclear and/or unclassified content ETs by

M/C dyads during SSFP	Ho16	negative r*
M/C dyads during SBST	Ho16	not rejected
M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	not rejected
C during M/C SBST	Ho20	not rejected
F/C dyads during SSFP	Ho18	negative r**
F/C dyads during SBST	Ho18	negative r*
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected

There will be no significant relationship between C/F BSI scores and:

% of substantive content ETs by

F/C dyads during SSFP	Ho18	not rejected
F/C dyads during SBST	Ho18	not rejected
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
M/C dyads during SSFP	Ho16	not rejected
M/C dyads during SBST	Ho16	not rejected
M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	not rejected
C during M/C SBST	Ho20	not rejected

% of instructional content ETs by

F/C dyads during SSFP	Ho18	not rejected
F/C dyads during SBST	Ho18	not rejected
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
M/C dyads during SSFP	Ho16	not rejected
M/C dyads during SBST	Ho16	not rejected
M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	not rejected
C during M/C SBST	Ho20	negative r*

% of combined content ETs by

F/C dyads during SSFP	Ho18	not rejected
F/C dyads during SBST	Ho18	not rejected
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
M/C dyads during SSFP	Ho16	not rejected
M/C dyads during SBST	Ho16	not rejected
M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	not rejected
C during M/C SBST	Ho20	not rejected

% of no predominant content ETs by

F/C dyads during SSFP	Ho18	not rejected
F/C dyads during SBST	Ho18	not rejected
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
M/C dyads during SSFP	Ho16	not rejected
M/C dyads during SBST	Ho16	positive r*
M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	positive r*
C during M/C SSFP	Ho20	not rejected
C during M/C SBST	Ho20	not rejected
% of unclear and/or unclassified content ETs by		
F/C dyads during SSFP	Ho18	not rejected
F/C dyads during SBST	Ho18	not rejected
F during F/C SSFP	Ho18	not rejected
F during F/C SBST	Ho18	not rejected
C during F/C SSFP	Ho22	not rejected
C during F/C SBST	Ho22	not rejected
M/C dyads during SSFP	Ho16	not rejected
M/C dyads during SBST	Ho16	not rejected
M during M/C SSFP	Ho16	not rejected
M during M/C SBST	Ho16	not rejected
C during M/C SSFP	Ho20	not rejected
C during M/C SBST	Ho20	not rejected

Note. All hypotheses were tested by using Pearson product moment correlations. Alpha was set at .05. C/M BST scores = scores obtained after mothers taught (n =23). C/F BST scores = scores obtained after fathers taught (n =23). M = mothers. F = fathers. C = children. SSFP = semi-structured free-play activity. SBST = structured block sorting task activity.

[a]Trend for positive r (r =-.40; p <.05 if r =-.42).

* $p<.05$. ** $p<.01$. *** $p<.001$.

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PARENTS AS TEACHERS:

LINGUISTIC AND BEHAVIORAL INTERACTIONS OF MIDDLE-CLASS MOTHERS AND FATHERS AND THEIR NORMALLY DEVELOPING AND DEVELOPMENTALLY DELAYED PRESCHOOLERS DURING TEACHING/LEARNING ACTIVITIES

Final Report.

Ruth Jacobson Kahn, Ph.D.

The University of Connecticut, 1981

The purposes of this study were to describe the verbal-logical behaviors expressed and the content referred to by parents and their preschoolers while they were engaged in teaching/learning interactions, and to determine if the structure of the activity, the sex and/or the developmental status of children, or the sex/role of parents influenced those behaviors. Twenty three children were observed, once with their mothers and once with their fathers. Eight children were normally developing boys (NDB), 8 were normally developing girls (NDG), and 7 were developmentally delayed boys (DDB). All parent/child dyads engaged in a semi-structured free-play activity followed by a structured block sorting task.

Ruth Jacobson Kahn--The University of Connecticut, 1981

The observation system used was a modified version of the Columbia Instrument which permitted the coding of verbal behaviors in terms of linguistic forms, communicative functions, and content references.

Three-way analyses of variance with repeated measures were used to compare: (1) discourse behaviors of parent/child dyads with NDB, NDG, and DDB; (2) behaviors during each of the two activities; and (3) behaviors of mother/child versus father/child dyads.

The activity factor had the most impact on the expressed behaviors. For parents and children it influenced how much they participated, verbalized, responded, referred to substantive content, especially classification, and referred to instructional content. In addition, for parents, activity influenced their frequencies of initiating, asking tag questions, explaining or asking questions about substantive content, repeating or expanding their children's statements, and giving orders. For children, activity influenced their soliciting, requesting or providing substantive information, referring to persons, cooperating, and overt noncompliance.

The only behaviors differentiating groups of parents and their children were their verbalizing and their references to spatial relationships and classification. Parents of NDG and NDB explained more substantive content. expanded and referred to the truth and propriety of their children's statements more. offered more positive ratings. uttered less orders. and less negative ratings. The NDG and NDB provided or requested more instructional information. repeated parents' statements less and were less noncompliant than DDB.

There were few parent sex/role differences. Mothers tended to be more verbal and assertive than fathers. They placed more emphasis on substantive content. Fathers offered and elicited more opinions about the tasks.

Three-way analyses of variance with repeated measures were used to compare sequences of behaviors. Comparisons involved the type of content discussed. the duration. and the amount and type of participation.

The activity exerted the most influence on sequences of behaviors. Parents participated. intruded. and emphasized the relevant content more during the structured activity. Children. generally accommodated their behaviors to their parents. Mothers were more verbal and uttered more monologues. Brief transaction occurred most frequently. particularly during father/child interactions.

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Product moment correlations were calculated to assess the relationship of behaviors to children's block sorting test scores. Behaviors during mother/child interactions, particularly mothers' behaviors, were related to scores obtained after mothers taught and after fathers taught. Less behaviors during the father/child interactions were associated with scores after fathers taught. Some of these had a relationship to scores obtained after mothers had taught.

The results suggest that: (1) Fathers can teach preschoolers, (2) both parents have an indirect influence on teaching/learning interactions between their child and their spouse, (3) there are few differences between parents' teaching styles, (4) the differences that exist seem complimentary and enriching for children, (5) the structure and objectives of an activity have a major influence on the behaviors expressed, and (6) children and parents calibrate many of their behaviors to match each others behaviors.

Methodological issues are raised and implications for preschool intervention programs are discussed.